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A STUDY OF CAPRIFICATION IN FICUS NOTA

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Four text figures

It is a well-known fact in horticulture that Smyrna figs can be produced only through the agency of certain minute insects of the superfamily Chalcidoidea, which perform for the figs the act of cross pollination. The careful investigation of this marvelous symbiotic relationship between plant and insect was due, in the first instance, to European scientists. Americans in California took careful account of all the facts involved, in their introduction of the Smyrna fig into that State, building up there business involving many thousands of dollars, all hanging on the successful pollinating operations of these minute insects.

Observations were later extended to various wild figs, many new and strange forms of fig insects were described, and in some cases attempts made to trace the details of the symbiosis, as for instance by Cunningham on *Ficus roxburghii* in India.[2]

Superficial observations in Cuba and in Brazil had previously indicated to me very definitely the astounding extent and the very varied possibilities of this subject. The number of known species of figs is said to be above five hundred. In many of these the character of the caprification phenomena varies very

[1] Eisen, *Bull. Div. Pomol, U. S., Dept. Agr.* (1901), No. 9. This bulletin contains a full bibliography of the subject.

[2] *Ann. Royal Bot. Garden, Calcutta* (1889), 1, 13–47, pls. 1–4.

widely, and many of the insects involved seem to be quite confined to certain species of figs. At Los Baños, Philippine Islands, with *Ficus nota* (Blanco) Merrill [3] abundant, and occurring almost at the door of the bamboo shack in which I live, I have been enabled to begin a study of the caprification phenomena in this particular fig. In outlining my preliminary results I shall not repeat descriptions of the species or even detail its flower characters. *Ficus nota* is a tree of the section *Covellia*, apparently common throughout the Philippines.[4] The figs are produced often in enormous quantities at the base of the trunk and even to some little distance underground. Fruiting twigs also occur higher on the trunk and even on the branches, although the number produced above is small.

As usual among figs, certain trees of *Ficus nota* produce only gall flowers and no seed, but have fertile male flowers (stamens). Other trees of the same species produce only figs containing fertile female flowers destined to make seed, and these figs usually have no fertile stamens, although rudiments are frequently present in the area just within the ostiole commonly occupied by the stamens in gall figs. The young flower zone of the fertile fig is bright pink in color, which is rare in the caprifig form. Also the fertile figs, especially the young, incline to deep purplish in external color, with greenish or yellowish flecks, whereas the caprifigs are usually entirely green. This condition is locally common, but I do not know whether or not it is general throughout the Islands.

On trees bearing figs with gall flowers and stamens, the production and ripening of the figs is almost continuous, and the broods of gall insects thus overlap endlessly. There is no possibility of here distinguishing such seasonal procession as is indicated by the profichi, mammoni, and mammæ of the Smyrna caprifig; on the contrary, the seed-bearing trees, locally at least, seem to produce figs in regular crops. At the present writing (November), a crop of large figs just maturing may be found on fertile trees, but another crop of small figs is also coming on—some of them already being large enough to receive the insects coming from the gall-bearing trees.

If a large mature caprifig (gall fig) is opened, the walls of the

[3] Determined by E. D. Merrill, Bureau of Science.

[4] Blanco, Fl. Filip. ed. 1 (1837), 677 (*F. aspera nota*); Merrill, *Bur. Govt. Labs.* (1904), No. 17, 10; Elmer, *Leafl. Philip. Bot.* (1906), 1, 198 (from Leyte); (1911), 4, 1262 (describes the fertile tree, from Mindanao).

interior are found to be thickly massed with the densely packed brown galls produced from the modified ovaries of the infertile female flowers. In a narrow area about the inner mouth of the ostiole (now closed by thickly imbricated scales) are the closely placed bright pink, unopened, monandrous flowers. When kept under observation for a few days, they present a confused maze of activities. From certain of the galls appear numbers of queer, clumsy, wingless, yellow insects—the males of the blastophaga. Immediately after they emerge, they turn their attention to gnawing small holes in the still unopened galls. This quest for the female seems completely and continuously to occupy their attention. Many times holes are made and the gall then immediately deserted, and in such cases galls will be found to contain insects other than the blastophaga—guests or parasites. These small holes are made at any accessible point on the surface of the gall. In case the gall happens to contain a female blastophaga, the tip of the male abdomen, which is closely recurved under the body and projects forward between the forelegs and just beneath the mouth, is introduced into the gall without any change in general attitude of the body of the male, and copulation with the imprisoned female takes place. The beauty of this extraordinary position of the male abdomen is seen as the work of the male proceeds, since to reach all the galls in the lower layers it must push itself into crevices where any great movement of the body is impossible, and must fertilize females in galls which can only be reached by the anterior end of the body. Copulation accomplished, the males make no attempt whatever to enlarge the minute hole made for this purpose. The female gnaws her own way out immediately after copulation. This is in striking contrast to the case of the Smyrna fig insect, in which the male is supposed, as stated by Eisen, to liberate the female after copulation; however, observations on this point should be repeated. The male continues on its quest, rapidly gnawing into gall after gall, and repeating the act of copulation, until exhausted and dying. In its nervous haste, the male occasionally bites into the stamens also, but any intentional attack on the stamens, as described by Cunningham for *F. roxburghii*, does not occur in *F. nota*, nor can I see any reason for such attack beyond mere accident.

With the rapid emergence of the males, followed by the emergence of the females, the scene in the fig becomes exceedingly animated. During this time, males also of various guests and parasites (*Philotrypesis, Agaonella, Sycophaga,* and *Sycoryctes*)

begin to emerge and seek their respective females. These males show a perfectly astounding case of parallel development to suit the very circumscribed conditions with which they are surrounded. Representing 2 families of insects, 3 subfamilies, and various genera, they are yet all very similar in appearance—minute, yellowish, wingless, clumsy, often worm-like creatures, either blind or nearly so, they live their exceedingly short mature lives (of apparently only a few hours' duration) in darkness, never purposely leaving the interior of the fig in which they are born. Entirely unlike the female in almost every detail, and struggling together in large numbers, they present a most confusing sight even to the eye of the trained scientific observer. It is a matter of extreme difficulty correctly to associate the sexes, the observation of actual copulation being necessary sometimes to make the conclusion a certain one. When it is known that 6 species of guests and parasites may occur together in great number within a single fig, as I have commonly found in *F. nota,* the complexity of the problem as a whole, both taxonomically and biologically speaking, may be appreciated.

As the emergence proceeds, the fig becomes filled with an impatient mass of females, intent only on finding a way out. During this period the stamens rapidly reach full maturity, and, quite apart from any holes in the anthers due to the males, they dehisce naturally and regularly through two longitudinal slits (fig. 1, F). The trampling swarm of insects promptly dusts pollen thoroughly over their bodies. It is a beautiful point in the whole relationship that the fig remains closed until this is accomplished. The maturing of the stamens is accompanied, or at least very shortly followed, by the withering of the imbricated scales in the ostiole, beginning on the inside. I have not observed males gnawing these scales, and can see no reason why they should do as is described by Cunningham for *F. roxburghii.* That the females should immediately begin to crowd themselves through any opening offered is to be expected, and it is also entirely probable that they hasten the formation of this opening by gnawing, but it seems as if the shrinkage of the scales must be an entirely natural act in the final maturing of the fig. I have found malformed figs in which this opening was delayed, and the entire mass of contained insects dead. In *F. palmeri* from Lower California, as described by Eisen, no such ripening of the scales takes place, and the blastophaga does not attempt to gnaw through them, but has acquired the habit of opening a new passage through the softer wall of the fig near the ostiole.

That some males might accidentally crawl through, or be hustled through, an opening to the outside, is also to be expected, although apparently they would have absolutely nothing to accomplish by a voluntary act of this sort. A remarkable fact is here to be observed—that the emergence of all females from the figs and the death of the males is not at all the closing chapter in the history of the receptacle. The fig survives long after these events, and ultimately passes into a much thickened stage of ripening in which its appearance is much modified, and which is finally followed by softening and rotting or by the work of devouring animals.

It is likewise a remarkable fact that of the tens of thousands of blastophagas, guests, and parasites that are constantly emerging, I have taken none with the sweep net in surrounding foliage, although I have in this way gathered thousands of minute parasitic Hymenoptera in other groups. Apparently their flight is direct to other figs on the same tree or to other trees of this species. In case the female blastophaga passes to smaller figs on the same tree or on another caprifig, she proceeds at once to the ostiolar end of the receptacle and enters there, pushing her body back and forth between the closely overlapping scales in most laborious fashion, until the interior is reached. Whether the wings are broken off during this attempt, as stated by Eisen for the Smyrna blastophaga, or whether they are deliberately removed by the insect itself, as occurs in the females of many ants, I am not certain. In any event, entrance of the fig always involves dealation. I incline to believe that in part at least voluntary dealation may occur, since I have found the discarded wings adhering to the surface of the fig some little distance about the ostiolar opening, as well as among the scales that guard the mouth of the opening itself. Having accomplished entry to the fig, the female finds the specially modified funnel-shaped stigmas (fig. 1, A), awaiting the deposition of eggs. The eggs are inserted one through each style to just within the ovary, lying upon the ovule destined to furnish food to the developing larva. One female is capable of depositing very many eggs, although gall figs are commonly encountered in which very few ovaries are occupied. Often as many as a dozen females or more gain entrance to the same fig, so the oviposition is usually quite complete. The female dies immediately after egg laying is concluded.

However, in case the female has found her way to a tree bearing only figs destined to produce seed—and she seems

entirely incapable of detecting this fact—she enters the fig in the same way, but there encounters only stigmas of another type (fig. 1, C), not adapted to the reception of her eggs. She vainly searches the interior of the fig, over and over, involuntarily distributing to the normal stigmas the pollen with which her body was thoroughly dusted, until thwarted and exhausted, she finally dies. From one to a dozen or more dead bodies of females sacrificed to this service may be found in each young fertile fig. More or less rapid disintegration of the dead bodies of these females takes place in the liquor which commonly accumulates in the interior of the developing fig.[5]

None of the guests nor parasites of *F. nota* enters the fig by the ostiole for oviposition as does the blastophaga. They all possess ovipositors of extraordinary length with which the entire wall of the receptacle is pierced. Whether the eggs of the guests and parasites are inserted in the ovaries directly, or whether they hatch outside of the ovary and find their way through the style, is as yet unknown; indeed, the entire question of their specific relations to the blastophaga is an open one. That their larvæ must commonly develop in ovaries already occupied by blastophaga seems certain, and as the two cannot live in one and the same ovary, and as the guests and parasites certainly eventually occupy ovaries in enormous numbers, they must surely interfere seriously with the blastophaga; although whether as

[5] The presence of a liquor in the developing fig is a matter apart and a very interesting one—seemingly a question for the plant physiologist. The presence of liquor in the earlier stages would prevent the successful entrance of the female blastophaga. I have not seen much liquor in figs at the receptive age. Later there seems to be some connection between its formation and the occurrence of very heavy rains, at which times the figs may become fairly turgid with it. Mr. A. D. E. Elmer tells me that at times certain species of figs in the Islands produce this liquor in such quantities that it drips from them to the extent of forming pools on the ground beneath.

Cunningham mentions observing infusorians and "filariæ" in this liquor. These and bacteria would be expected under the circumstances. I was, however, especially interested in his mention of "filariæ." Many years ago when I first went to Cuba as agricultural botanist to the Estacion Central Agronomica, I at once began observations on the local fig insects. In one species the females frequently had the abdomen enormously swollen, and this I found packed with nematodes. Wheeler [*Am. Nat.* (1901), 35, 877] has published accounts of a similar "mermithergatism" in ants, due to the presence of *Mermis*. In one of the first figs of *F. nota* which I opened in these Islands, I found a female fig insect with abdomen distended by worms; and in the liquor of certain figs "filariæ" were common, although whether the same as the parasitic form or not is unknown. Here is a most interesting problem for the helminthologist.

direct parasites or as unwelcome guests remains to be determined. It is, of course, a well-known fact that many parasitic hymenopterous insects possess to a most remarkable degree the faculty of locating their hosts, even when these are hidden deeply within the tissues of plants, and boring through with great accuracy for the deposition of their eggs. Dr. E. B. Copeland suggests that this, together with the fact that none of these

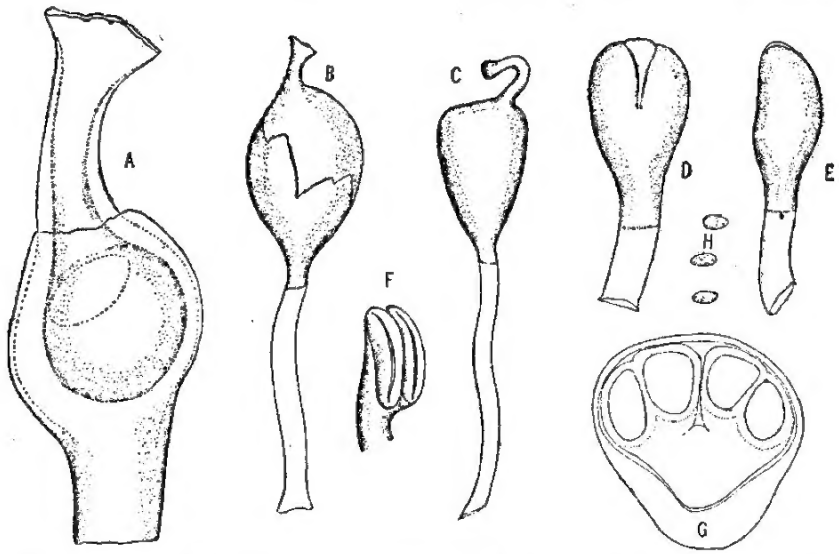


FIG. 1. Flower parts of *Ficus nota*. A, young gall flower at the time of reception of egg, with funnel-shaped style with undivided or unruptured perianth (1.5 by 0.5 mm.); B, nearly mature gall flower, long pedicelled form, with ruptured perianth (5 by 1.25 mm.); C, nearly mature fertile female flower, with normal stigma, long pedicelled form (5 by 1 mm.); D and E, mature monandrous male flower with unruptured perianth (3 by 1 mm.); F, the freed stamen dehiscing by 2 slits; cross section of unopened male flower; H, pollen grains, averaging about 7 by 12 microns.

insects seem to seek or deposit eggs in seed-bearing figs, appears to be prima facie evidence of parasitism or semiparasitism.

THE FIG INSECTS OCCURRING IN FICUS NOTA AT LOS BAÑOS

The classification of the fig insects is in a most undeveloped state, not only because very few of the existing species are described—or, if described, known in both sexes—but also because few of the characters given are of generic or subfamily value. It seems inevitable that new discoveries will completely modify the generic arrangement, and probably cause a recasting of the subfamilies. The statement made by Ashmead [6] that all Agao-

[6] *Mem. Carnegie Mus.* (1904), 1, 231.

nidæ are caprifiers is not true, if any with long ovipositors and which oviposit from the exterior of the fig are admitted to that family. His statement that the head in males of Idarniinæ is "long or oblong" must likewise be modified, since there are some with heads as broad as long, and others with the heads even broader than long. The degree of excavation of the upper surface of the head is very variable through the series of species. The ovipositor may be very short in Agaonidæ. Also the middle legs may be much slenderer than the others, and the male head may be more deeply foveate in certain Idarniinæ than in certain Agaonidæ, and any definite group line, between a long vermiform abdomen and a short pointed one, is impossible to draw. There is the greatest necessity of collecting more than usually extensive material in these groups for the right kind of study. The different species of figs should be carefully examined one by one, and large numbers of the contained insects, both male and female, collected in vials of alcohol, carefully labeled with the full name of the fig.

Family AGAONIDÆ

Subfamily AGAONINÆ

Blastophaga nota sp. nov.

Male.—Pale yellow throughout, the abdomen paler, naked except for the very large deformed posterior legs, almost the entire surface of which is minutely thickly pilose. Head, 0.7 mm. long by 0.43 mm. wide, subrectangular, slightly narrowed in front, with the sides broadly rounded; eyes wanting. Mandibles very strongly, deeply, and evenly bidentate. Antennæ inserted in deep narrow sulci which pass caudad from base of mandibles and converge at 0.25 mm. in length of head. Antennæ not exceeding tips of mandibles, 5-jointed, the pedicel and last joint long and subequal, and each about one-half the length of the scape, the third still shorter.

Pronotum trapezoidal, as broad caudad as head, but apically narrower. Mesonotum transverse, slightly wider than pronotum. Metanotum (used in males as including dorsulum) triangular, the angles broadly rounded, as wide as, and longer than, mesonotum. Abdomen vermiform, abruptly bent after the first segment, and closely reflexed under the thorax, its apex, at rest, extended forward to middle of head.

Fore and hind legs greatly distorted and modified, the middle legs normal. Fore tibiæ (fig. 3, E) greatly broadened apically, the apical angles produced into heavy incurved teeth; fore tarsi

2-jointed, the second twice the length of first. Middle tibiæ of normal form, but apically produced into several stout teeth; the tarsi have the first joint equaling the next 2 in length, the last as long as the 3 preceding. Hind tibiæ apically with a small bidentate process, and a stout movable tooth; the tarsal joints (fig. 3, D) greatly enlarged and swollen, becoming broader to the last which is subrectangular, the claws being attached to the lower apical angle; the last joint equals the first in length, and these are each much longer than the 3 intermediate ones. Male genitalia without armed claspers. Length, 3.5 mm.

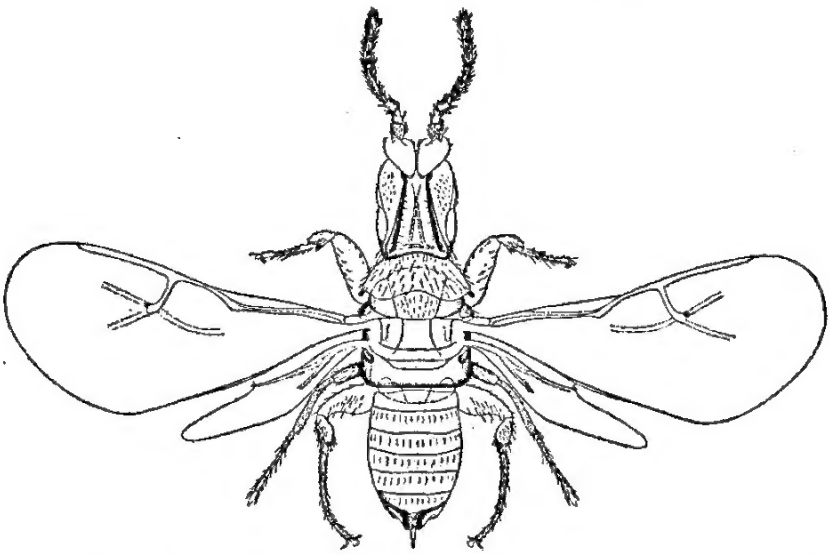


FIG. 2. Female of *Blastophaga nota*. The vestiture of the wings, consisting of very numerous minute bristles, is omitted. Note the remarkable projections from prothoracic spiracles.

Female (*fig. 2*).—Color dark brown, the legs paler, the wings large and very heavily pubescent. Head very large, subrectangular, somewhat swollen in front of the eyes which are in basal half of head. Upper surface of head with a deep broad excavation having calloused and spined margins, and broadened to the occiput where the median ocellus is inserted in its hind border and directed forward; the lateral ocelli obsolete. Antennæ 11-jointed, the scapes enormously swollen, contiguous, and entirely covering the mouth above, the pedicel with many short recurved spines, the third joint small and with a finger-like apophysis; the fourth still smaller; the fifth and following normal, and with numerous short longitudinal sense furrows.

Thorax strongly square-cornered caudad, where it is much broader than the abdomen. Whole body with numerous short stiff bristles, these occurring in single transverse rows on the abdominal tergites. Ovipositor very short. Postmarginal vein much longer than marginal, the stigmal slightly shorter than marginal. Fore tibiæ resembling those of male, about one-third the length of their femora, but the tarsi normally 5-jointed. The hind tibiæ about one-half the length of their femora, and at the inner apical angles with a stout spine and a minute bidentate process; hind tarsi very long, the first joint longer than the 2 following; the second to fourth subequal; the fifth about one-half the length of the first. Length, 2 mm.

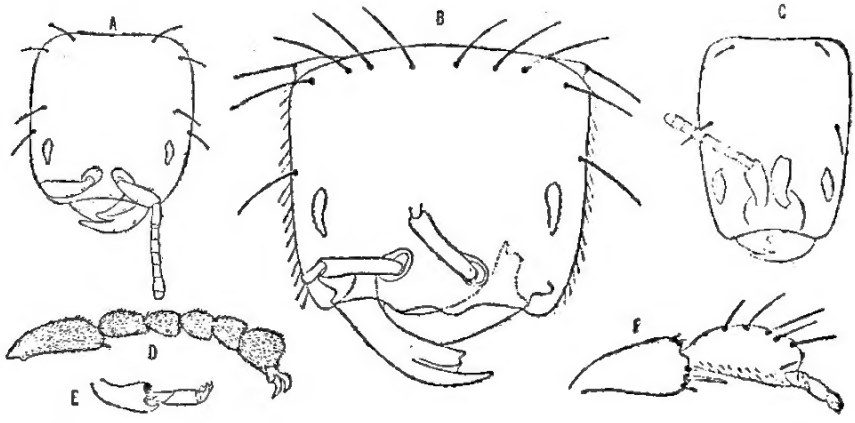


FIG. 3. Some anatomical details of fig insects. A, head of *Philotrypesis similis* (0.6 by 0.6 mm.); B, head of *Philotrypesis collaris*, the spined extensions shown at angles of occiput being below (size of head, 0.95 by 1 mm.); C, head of *Philotrypesis ashmeadii* (0.55 by 0.7 mm.); D, hind tibia and tarsus of *Blastophaga nota;* E, fore tibia and tarsus of *Blastophaga nota;* F, hind tibia and tarsus of *Sycoryctes philippinensis.*

This blastophaga is the normal inhabitant of the gall flowers and the active caprifier of *Ficus nota* at Los Baños, P. I.

AGAONELLA genus novum

Male.—Wingless and naked, wanting even thread-like or bristle-like rudiments. Head and thorax very narrow and attenuate and subequal in width; head more than 3 times longer than wide, the eyes consisting of oval pigment spots on the anterior third; abdomen white, long, vermiform, and generally carried extended caudad. Antennæ 3-jointed and inserted in depressed foveæ near the mouth; mandibles very stout and bidentate. Prothorax and metathorax subequal in length, the mesothorax shorter, the two last about one-half the depth of the first.

Legs short and subequal, femora all swollen, the tibiæ shorter than femora, stout, apically heavily spined; tarsi 5-jointed, as long as tibiæ, the fifth as long as preceding and with heavy simple claws.

Female.—With the ovipositor nearly twice the length of body, the abdomen waspish in shape. Head broader than long, margins evenly curved, the upper surface with a broad deep groove embracing insertions of antennæ and broadening backward to and including median ocellus. Antennæ 12-jointed, the scape very long and slender, 2 small ring-joints, the remaining segments subequal and bearing many longitudinal sense-organ grooves. Mouth parts small and more deeply included within the frame of the head than usual, the mandibles unidentate. Maxillary palpi 4-jointed, the second and fourth joints longest and subequal, the third distinctly shorter than the first. Labial palpi 2-jointed, the second joint a fourth longer than the first. Legs very long and slender, the middle pair considerably slenderer than the others. Middle and hind tibiæ as long as their femora and strongly spined apically, the tarsi nearly as long as the tibiæ and with proximal segment as long as, or longer than, the 3 following. Scutellum flat. Parapsidal furrows distinct. Wings heavily veined for this group, the marginal and postmarginal subequal, the stigmal shorter with a long club-shaped tip.

This very distinct genus—distinct in either male or female—shows some resemblances to *Agaon* from Africa, but is widely distinct from that or any other genus.

Agaonella larvalis sp. nov.

Male.—Head and thorax yellowish, abdomen soft and whitish. Body quite nude. Head rectangular in general outline, 0.55 mm. long by 0.18 mm. wide, varying from 0.17 mm. deep at base to 0.1 mm. at mouth. Scape of antennæ longer than the 2 succeeding joints, the third joint and apex of second somewhat inflated. The small antennal fossæ only separated by a carina. Prothorax subrectangular, similar in size and shape to the head; the mesothorax slightly shorter, similar in dorsal outline, but only one-half as deep; metathorax as long as prothorax, but only as deep as mesothorax. Coxæ large, long, parallel-sided, more than one-half the length of their respective thoracic segments, much longer than the swollen rounded femora. Tibiæ strongly broadened apically, and there armed on the outside with about 20 closely placed, short, heavy, tooth-like spines. Male genitalia consisting of 2 lateral, stout terete styles, with

long apical spines, and 2 short stout dark brown subrectangular claspers, each armed on its distal border with 2 short, stout, black teeth. Length, about 2.5 mm.

Female.—Metallic dark greenish in color, the wings iridescent, the legs pale yellow, the abdomen slender at base and strikingly waspish in shape, the ovipositor about twice the length of the body which is 2.5 to 3 mm. long. Head, 0.5 mm. wide, 0.35 mm. long, the eyes very strongly bulging, the face broadly rounded in front, the upper surface with a broad deep cavity that broadens caudad; antennæ inserted in small sockets which are in the middle of the face, and distant their width from each other, and as far from eyes as from anterior margin of head. Scape yellowish, long and very slender, its length 9 times the width, and equal to more than pedicel and first 4 joints of flagellum together; pedicel about one-fifth the length of scape and with the rest of the antenna, fuliginous; 2 small ring-joints; flagellum 8-jointed, the joints similar and with numerous very long sense furrows. Mandible small and unidentate. Labial palpi 2-jointed, the second one-fourth longer than first; maxillary palpi 4-jointed, the second and fourth the longest and subequal, the third distinctly shorter than the first. Thorax above with shining, but coarsely shagreened surface. Scutel very large, subelliptical. Abdomen waspish, very slender at base, in all of the specimens at hand with the ventral plates bent far forward, giving a most remarkable appearance to the whole. Ovipositor about twice the length of the body, sparsely haired and not at all swollen at the tips of the sheaths. The femora longer than tibiæ, the fore metatarsal joint as long as 2 succeeding joints, the mid and hind metatarsi longer than all succeeding joints together. The wings sparsely haired.

Common in *Ficus nota* at Los Baños, P. I.; probably a guest in its relation to the blastophaga.

Subfamily SYCOPHAGINÆ

Sycophaga nota sp. nov.

Male.—Slender, pale yellowish brown, the abdomen concolorous, not recurved under thorax, broadened to the apex where it is furnished with 2 long, slender, lanceolate, thickly and finely pilose laminæ connected with the last, and only, abdominal spiracles. Head, 0.38 mm. wide by 0.8 mm. long, and averaging 0.14 mm. more or less deep throughout; rectangular, parallel sided, the occipital angles strongly produced caudad, the median ocellus on occipital border and directed forward, the lateral ocelli wanting. Upper surface of head with a broad

shallow depression more than one-half its width extending from occiput to mouth. Antennæ small, inserted nearer to lateral margins of head than to each other, 4-jointed, the scape swollen, the second joint two-thirds of third, the fourth about one-half the length of second and not wider than third. Mandibles very large, their bases reaching sides of head, tridentate. Prothorax three-fourths the length of head, subtrapezoidal, slightly broader than head posteriorly, and slightly narrower anteriorly, the upper surface of all thoracic segments with a more or less distinct continuation of the median cephalic depression. The prothorax is, as usual, deeper than either meso- or metathorax. Meso- and metanotum subrectangular, the former divided by a transverse suture, nearly 0.6 mm. long, the latter, 0.5 mm. long. Legs all very similar in structure and armature, the posterior longest, the tibiæ along anterior and apical portions armed with some 20 to 30 short stout teeth which are thickly

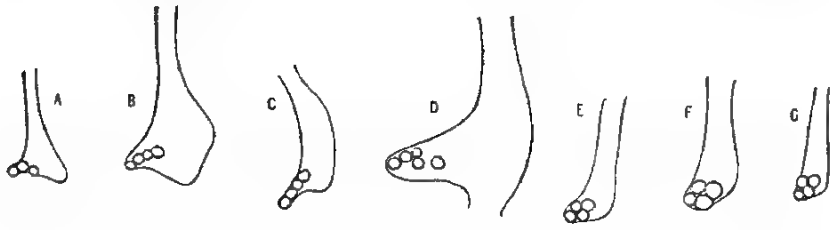


FIG. 4. Showing the very peculiar pustular organs in the clavate tip of the stigmal vein in the female wing: A, *Sycophaga nota;* B, *Sycoryctes philippinensis;* C, *Agaonella larvalis;* D, *Blastophaga nota;* E, *Philotrypesis similis;* F, *P. collaris;* G, *P. ashmeadii.*

set. Metatarsi as long as all remaining tarsal joints together, the fifth one-half of the first; the second, third, and fourth very small, subequal, and together about equal to one-half the fifth. Head and thorax smooth and naked, but abdomen minutely thickly longitudinally striolate, about 1.2 mm. long, about 0.3 mm. wide at base and 0.5 mm. at apex, the apical angles provided with 2 narrowly lanceolate laminæ, about 1.4 mm. long, which are very thickly and finely pilose throughout; these laminæ at base form a partial funnel surrounding the last, and apparently only, abdominal spiracle, which is very large; these terminal spiracles connect with 2 enormous tracheal trunks which are somewhat bent and coiled posteriorly, are together more than one-half the width of the abdomen anteriorly, and occupy a large part of its cavity; these great tracheal trunks pass forward, occupying nearly the entire body cavity, connect with the metathoracic and mesothoracic spiracles, have one con-

necting anastomosis in the prothorax, and then diminishing rapidly in size pass on to nearly the full length of the head. Male claspers are present as small dark-brown subrectangular pieces, that have at least 1 small apical tooth. Total length, without laminæ, 3.8 to 4 mm.

Female.—Dark yellowish brown, dorsum darker, end of abdomen and legs pale; ovipositor, occiput, and eyes blackish. Head slightly narrower than thorax, face very broad between eyes, narrowing above, slightly swollen, broadly rounded over the small mouth, and with no indication of longitudinal depression. Antennæ inserted in small sockets, which are separated somewhat more than their width, and are very close to the anterior margin of the head; antennæ 13-jointed, scape long and slender, the length more than 4 times the width, pale yellowish, the remaining joints fuliginous; pedicel narrower than scape and about one-half its length; 2 small ring-joints; remaining joints very similar, with numerous long sense furrows, the last 2 joints somewhat shorter than preceding. Lateral ocelli nearer eyes and nearer to occiput than to median ocellus. Whole body sparsely covered with short stiff hairs. Mesonotum with complete deep parapsidal grooves and coarsely shagreened. The scutellum smooth, large, and almost exactly quadrate. The metanotum with hind angles obliquely cut off and the surface minutely longitudinally striolate. Abdomen as broad as thorax and considerably longer. Head, 0.4 mm. long; thorax, 0.85 mm. long; abdomen, 1.25 mm. long. Ovipositor slender, 6 mm. long, rather sparsely haired, the tips of sheaths not at all swollen. Middle legs very much slenderer than the others; middle tarsi resembling hind tarsi, the fore tarsi very different; first joint of fore tarsi equals the 2 following together in length, the fifth joint equals the 3 preceding together; in mid and hind tarsi the first joint is nearly as long as the 3 following together, the 3 latter successively shorter, the fifth about as long as second; all of the tibiæ possess stout spines which are distinctly anteapical. Postmarginal vein longer than marginal, the stigmal short and weak.

Not at all common in gall figs of *Ficus nota*, at Los Baños, P. I., and apparently a guest. I have seen no previous remark on the altogether remarkable tracheal system in certain male Sycophaginæ—more remarkable in its way than that of the migratory Acrididæ. The terminal abdominal laminæ are indubitably a part of this tracheal system, surrounding and projecting from the large abdominal spiracles. They present very much the superficial appearance of certain branchial epi-

podites in some macrurous crustacea. The meaning of this enormous inflation and complex development of the tracheal system in male *Sycophaga* presents a most interesting subject for further investigation.

Family TORYMIDÆ

Subfamily IDARNIINÆ

Sycoryctes philippinensis sp. nov.

Male.—Pale yellowish and nude, with small pigment-spot eyes; long rectangular head, short abdomen, and the hind legs greatly lengthened with a laminately expanded first tarsal joint. Head subrectangular, the angles rounded, the lateral margins nearly parallel; length, 0.6 mm.; width, 0.3 mm., the small eyes on lateral margins at anterior third. Mandibles large, unidentate, inserted close together beneath anterior margin of head, and far from the lateral margins, this causing their strong extension cephalad, while at rest their points are crossed and resemble as viewed from above the crossed bill of *Loxia*. Antennæ inserted in small contiguous sockets, the distance of the width of each from the anterior margin of the head; antennæ little over one-half the length of head, 8-jointed, the scape stout and swollen, the pedicel slender and one-half the length of scape, next 2 joints irregular and subequal, the succeeding 2 very small and subequal, with next a club of 2 joints which is as long as the pedicel and broader. Head without longitudinal depression; ocelli all obsolete. Pronotum, 0.38 mm. long; mesonotum, 0.12 mm.; and metanotum, 0.33 mm. long; the pronotum much the deeper. Abdomen as long as thorax, narrowed to a point apically, but there with rather strongly compressed venter and greatly enlarged terminal spiracles. Anterior and middle legs normal in size, the tibiæ strongly enlarged apically and with several strong teeth at apical angles, the middle tibiæ only possessing also marginal teeth. In both fore and mid tarsi the last joint is the largest, the 3 intermediate very greatly reduced and subequal, and the basal joint about one-half the fifth in length. The hind legs of great size and length; coxæ parallel-sided and passing the middle of abdomen, while the femora exceed the abdomen; tibiæ broader at apex and larger than their femora, without marginal teeth, but with 1 very large and several smaller apical spines; tarsi (fig. 3, F) as long as tibiæ, the first joint greatly laminately expanded, as broad as tibiæ, longer than all remaining joints together, and at outer apical angle roundly extended beyond the insertion

of second joint to the length of that joint; the second, third, and fourth joints small, subequal, and together about equaling fifth joint in length; the first joint possesses on its outer margin 3 or 4 pairs of long, slender, curved spines. Male genitalia consisting of 2 blunt lateral styles, each with 2 apical spines, and 2 large subrectangular claspers each possessing 4 stout terminal teeth, these all being concolorous with the rest of the abdomen and not heavily chitinized or pigmented. The dimensions given above are from a specimen of average size; some specimens are slightly larger and others slightly smaller.

Female.—Above dark brown; the face and all lower parts pale; the legs light lemon yellow. Pro- and mesonotum, axillæ, and abdominal tergites coarsely reticulately shagreened; scutellum very large, flat, regularly subpentangular, and with the surface finely longitudinally shagreened. Mandibles unidentate; maxillary palpi 4-jointed; the first and third joints subequal, and about one-half the length of the second and fourth, which are subequal. Labial palpi 2-jointed; the first joint slender and longer than the strongly oval second. Hind tibiæ longer than their femora, and with only weak hairs and 1 large spine apically. Stigmal vein with an abruptly swollen subtrapezoidal tip. Head, 0.4 mm. long; thorax, 0.6 mm.; and abdomen, 1.2 mm. long; the ovipositor 9 mm. long, or more than 4 times the length of the body, slender, with comparatively few minute hairs, and with the sheaths distinctly swollen at tip.

Occurring in great numbers in November in gall figs of *Ficus nota* at Los Baños, P. I. I am inclined to regard this as a parasite in its relation to the blastophaga.

Philotrypesis similis sp. nov.

Male.—Head (fig. 3, A) subquadrate, the angles rounded, 0.6 mm. wide, and 0.6 mm. long, the pigment-spot eyes at anterior third and within the lateral margin. Face broadly excavated between the eyes, and sparsely transversely lineolate; antennal sockets small, separated a short distance, and with a weak longitudinal carina between them, about as far as their width from the anterior margin of the head. Antennæ, 0.5 mm. long; the scape, 0.15 mm., about twice longer than wide, pedicel very slender, one-half the length of scape, the single ring-joint small, the flagellum of 4 subequal points, each about one-half the length of the pedicel, and a barely indicated club of 2 joints. Mandibles large, bidentate, their basal margins remote from margins of head. Ocelli absent. Head above nearly nude, having only a few stiff bristles on the margins, but below rather thickly

bristly. Thorax with 2 filaments on either side; as broad as the head and 0.6 mm. long. Pronotum large, parapsidal grooves very faint, and with 2 strong setæ on each lateral margin. Sterna more heavily chitinized and very bristly. Abdomen as long as thorax, soft, paler in color, with few bristles, narrowing to an acute tip. Legs stout and strongly bristled. Hind femora more strongly swollen than the others; tibiæ all strongly broadened apically, the fore tibiæ shorter than their femora, the middle tibiæ as long as, and the hind tibiæ longer than, their femora; all the tibiæ are strongly armed with apical teeth, but only the middle and hind tibiæ have marginal teeth. Fore tarsi shorter than their tibiæ, 2-jointed, the second joint as long as the greatest width of their tibiæ; mid tarsi shorter than their tibiæ, 4-jointed, the first joint small, but as long as the 2 following together which are minute; the fourth large, twice longer than all the preceding together; hind tarsi longer than their tibiæ, first and second with apical angles produced in narrow lobes, longest behind and there provided with single long spines, second smaller than first, third minute, fourth as long as all the preceding together. Claws strong and with large fuliginous pulvilli. Male claspers rather elongate, slightly narrowed apically, the ends somewhat incurved and provided on the outer curve with a heavy retrorse spine, and near the point with a small porrect one.

Female.—Yellowish, with black markings on dorsum of abdomen, the ovipositor black, the legs pale yellowish. Head, 0.45 mm long; 0.55 mm. wide. Eyes strongly bulging, inner angles of eyes sharp, the face broader at mouth than at inner orbital angles. Lateral ocellus as near to eyes as to median ocellus, but nearer to the occipital margin. Maxillary palpi 4-jointed, the first and third very short, not one-half the length of the second, the fourth as long as all the preceding together, and narrowed gradually to the tip. Labial palpi with the second joint longer and broader than first, but apically narrowed to a teat-like point. Antennæ certainly with a distinct joint proximate of scape; scape 6 times longer than wide and with the pedicel pale yellow, the remainder fuliginous; pedicel one-third length of scape, swollen toward tip; 2 ring-joints very small; flagellum with 8 similar joints, the last 3, as usual, forming somewhat of a club. Parapsidal furrows distinct, but very shallow posteriorly. Scutel very large, suborbicular, but broader than long, convex; marginal vein very long, much longer than postmarginal; the stigmal very small and short and gradually

clavate at tip. Abdomen measured without the extended segments, 1.1 mm. long; first extended segment, 1.75 mm. long; the following, 0.4 mm. long, narrowing to its tip; ovipositor, 7 mm. long, the sheaths scarcely clavate at tip. Legs very slender, the middle much more so than the others. Fore tibiæ longer than their tarsi and shorter than their femora; mid and hind tibiæ as long as their tarsi but longer than their femora, joint 1 as long as the last 3 together, and 2 as long as 3 and 4 together.

Common in *Ficus nota* at Los Baños, P. I.

Philotrypesis ashmeadii sp. nov.

Male.—Exceedingly close in characters to *P. similis*, but head (fig. 3, C) distinctly longer than broad, 0.55 mm. broad by 0.7 mm. long. Scape dark brown, nearly 3.5 times longer than broad, pedicel less than half as long as the scape, flagellum pale yellowish, 8-jointed, the joints progressively wider, subequal in length save last 3, the last 2 forming a scarcely distinct club. All tibiæ as long as, or longer than, their femora; anterior margins of middle and hind tibiæ less numerously spined than in *P. similis;* first joint of hind tarsi short, not one-half as long as fourth joint, the latter much longer than all the preceding together; lobe of second joint not extending beyond the third. Male claspers long, parallel-sided, the outcurved blunt ends armed with 3 or 4 very stout black teeth.

Female.—Body clear brown; legs pale yellow. Differs from *P. similis* as follows: Lateral ocelli nearer to eyes than to median ocellus. Scape about 4 times as long as wide, pale yellowish; pedicel nearly one-half the length of scape, not as thick, and with the 3 ring-joints darker in color; flagellum fuliginous, of 5 similar segments, with a 3-jointed club. Abdomen measured without the extended segments, 1 mm. long; first extended segment, 2.4 mm., the second, 0.4 mm; ovipositor, about 5 mm. long, the sheaths distinctly clavate at tip.

Frequent in gall figs of *Ficus nota* at Los Baños, P. I. Probably parasitic on the blastophaga.

Philotrypesis collaris sp. nov.

Male.—The largest of the broad-headed, apterous males with short pointed abdomens to be found in the gall figs of *Ficus nota* at Los Baños. Head (fig. 3, B) subquadrate, 0.95 mm. long and 1 mm. broad, thus broader than long; a row of long stiff bristles along occipital margins; mandibles long and narrow, bidentate (the inner tooth subtruncate), and broadly overlapping; clypeus

broadly shallowly 2-lobed. Antennæ very small for so large a head, the small sockets remote, nearer to bases of mandibles and to front margin of head than to each other; scape a little over 4 times longer than wide, pedicel and flagellum together not as long as scape, the flagellum very pale in color, 8-jointed. Face deeply gradually excavated and finely sparsely transversely striolated. Prothorax as broad as head, with 2 large bristles on each lateral margin and 2 near the hind border; meso- and metathorax taken together shorter than the pronotum and becoming much narrower. Abdomen very small, narrower than metathorax, and rapidly narrowing to tip. Male claspers long and stout, with 3 stout black teeth at each tip. Fore legs to the tarsi, darker brown, remainder of legs pale yellow. Legs normal for *Philotrypesis*, but the lobes of first and second joints of hind tarsi with 2 long spines each, these joints together equaling the remainder of the tarsus in length. Body and legs entirely without the dense vestiture of stiff short bristles possessed by *P. similis* and *P. ashmeadii*.

Female.—Flagellum, top of head, meso- and metanotum, entire dorsum of abdomen, and ovipositor, blackish; remainder of body including pronotum, yellowish. Length of body without extended segments, 3.5 mm.; of first extended segment, 2 mm.; of second, 0.5 mm.; of ovipositor, about 4.5 mm. More similar to *P. ashmeadii* than to *P. similis*, having 3 ring-joints in the antennæ, and very similar in other characters.

Occasional in gall figs of *F. nota* at Los Baños, P. I. Probably parasitic on *Blastophaga*. It is very remarkable that 3 such similar species of *Philotrypesis* should occur in the same figs together, but although the females are somewhat alike the males are very distinct.

Synopsis of male fig insects found in Ficus nota at Los Baños.

a^1. Head far longer than broad; thorax without lateral filaments.
  b^1. First joint of hind tarsi not laminately expanded.
    c^1. Abdomen vermiform.
      d^1. Hind tarsi greatly enlarged, modified, and pilose; abdomen permanently folded under thorax; antennæ 4-jointed: fore tarsi reduced..... **Blastophaga nota.**
      d^2. Hind tarsi normal; abdomen very long and directed caudad; antennæ 3-jointed; fore tarsi normal..... **Agaonella larvalis.**
    c^2. Abdomen enlarged apically and provided with 2 long, lanceolate, tracheal laminæ; antennæ 4-jointed, the scape swollen; fore tarsi normal..... **Sycophaga nota.**
  b^2. First joint of hind tarsi laminately expanded; antennæ 8-jointed, scape swollen; fore tarsi normal..... **Sycoryctes philippinensis.**

a^2 Head quadrate or subquadrate, abdomen short and pointed, thorax with 2 lateral filaments on either side.

e^1. Head about as broad as long, or slightly longer than broad; flagellum longer than the swollen scape; produced lobes of 2 basal joints of hind tarsi with a single spine each; head and body beneath with coxæ and femora thickly set with short stiff bristles; abdomen as long as, or longer than, thorax.

f^1. Head about as broad as long; 2 basal segments of hind tarsi as long as remainder of tarsus, the lobe of the second overlapping the last..... **Philotrypesis similis.**

f^2. Head slightly longer than broad; 2 basal segments of hind tarsi about one-half of the length of last segment, the lobe of the second not reaching the last..... **Philotrypesis ashmeadii.**

e^2. Head broader than long; flagellum shorter than the linear scape; produced lobes of 2 basal segments of hind tarsi with 2 spines each; head and body naked; abdomen shorter than thorax.

Philotrypesis collaris.

Synopsis of female fig insects found in Ficus nota at Los Baños.

a^1. Ovipositor very short; head long, subrectangular; antennal scapes enormously enlarged so as to cover the mouth..... **Blastophaga nota.**

a^2. Ovipositor very long; head never subrectangular; antennal scape never greatly enlarged so as to cover the mouth.

b^1. Last 2 abdominal segments not tubularly extended.

c^1. Abdomen narrowed basally, waspish in shape..... **Agaonella larvalis.**

c^2. Abdomen very broad at base, not narrowed or waspish.

d^1. Antennæ with 2 ring-joints; scutel quadrate..... **Sycophaga nota.**

d^2. Antennæ with 1 ring-joint; scutel pentangular.

Sycoryctes philippinensis.

b^2. Last 2 abdominal segments tubularly extended.

e^1. Antennal scape 4 times longer than wide; length of first extended abdominal segment, 2.4 mm.; ovipositor about 5 mm. long; color, clear brown..... **Philotrypesis ashmeadii.**

e^2. Antennal scape about 6 times longer than wide; color of body largely a sharply contrasting yellow.

f^1. Largely yellow with a few dorsal black spots; length of first extended segment, 1.75 mm.; ovipositor, 7 mm.

Philotrypesis similis.

f^2. Pronotum and underparts clear yellow, remainder of dorsum black; length of first extended segment, 2 mm.; of ovipositor, 4.5 mm..... **Philotrypesis collaris.**

ILLUSTRATIONS

TEXT FIGURES

(Drawings by the author)

FIG. 1. Flower parts of *Ficus nota*. A, young gall flower at time of reception of egg, with funnel-shaped style with undivided or unruptured perianth (1.5 by 0.5 mm.); B, nearly mature gall flower, long pedicelled form, with ruptured perianth (5 by 1.25 mm.); C, nearly mature fertile female flower, with normal stigma, long pedicelled form (5 by 1 mm.); D and E, mature monandrous male flower with unruptured perianth (3 by 1 mm.); F, the freed stamen dehiscing by 2 slits; G, cross section of unopened male flower; H, pollen grains, averaging about 7 by 12 microns.

2. Female of *Blastophaga nota*. The vestiture of the wings, consisting of very numerous minute bristles, is omitted. Note the remarkable projections of prothoracic spiracles.

3. Some anatomical details of fig insects. A, head of *Philotrypesis similis* (0.6 by 0.6 mm.); B, head of *Philotrypesis collaris*, the spined extensions shown at angles of occiput being below (size of head, 0.95 by 1 mm.); C, head of *Philotrypesis ashmeadii* (0.55 by 0.7 mm.); D, hind tibia and tarsus of *Blastophaga nota;* E, fore tibia and tarsus of *Blastophaga nota;* F, hind tibia and tarsus of *Sycoryctes philippinensis.*

4. Showing the very peculiar pustular organs in the clavate tip of the stigmal vein in the female wing; A, *Sycophaga nota;* B, *Sycoryctes philippinensis;* C, *Agaonella larvalis;* D, *Blastophaga nota;* E, *Philotrypesis similis;* F, *P. collaris;* G, *P. ashmeadii.*

ORIGIN MYTHS AMONG THE MOUNTAIN PEOPLES OF THE PHILIPPINES [1]

By H. Otley Beyer

(*From the Division of Ethnology, Bureau of Science, Manila, P. I.*)

Four plates

Beliefs as to the origin of the earth, and of the men, animals, plants, and various topographical features found in it, seem to survive with greater persistence than any other trait of primitive culture. These beliefs lie at the base of nearly all religions, and the myths in which the beliefs are preserved are the foundation of literature. The preservation and study of origin myths is, therefore, of much importance in the reconstruction of the history of mankind which is the chief aim of anthropology.

The peoples of the Philippines have a rich and varied mythology as yet but little explored, but which will one day command much attention. Among the Christianized peoples of the plains the myths are preserved chiefly as folk tales, but in the mountains their recitation and preservation is a real and living part of the daily religious life of the people. Very few of these myths are written; the great majority of them are preserved by oral tradition only.

Until recent years, it has been believed that all ancient records written in the syllabic alphabets which the Filipinos possessed at the time of the Spanish conquest had been lost. It is now known, however, that two of these alphabets are still in use, to a limited extent, by the wild peoples of Palawan and Mindoro; and ancient manuscripts written in the old Bisaya alphabet have been lately discovered in a cave in the Island of Negros. Many of these Negros manuscripts are written myths, and translations of them are shortly to be published. The Bisaya peoples, in general, have preserved their old pagan beliefs to a greater extent than have the other Christian Filipinos, and it is to be

[1] Read before The Philippine Academy, October 2, 1912. The paper is intended as an introduction to a series of more complete studies in Philippine mythology and religion.

hoped that the discovery of these manuscripts will stimulate further investigations.

Among the pagan mountain peoples, with which this paper will chiefly deal, there are no written myths except those which have been recorded by Europeans in modern times. Some of the myths are sung or chanted only, while others are repeated in the form of stories. In nearly every case, the repeating of the myths forms an important part of the religious ceremonies of the people. Many different grades of culture are represented among these mountain peoples, and we find a correspondingly unequal development of their mythologies. All classes are represented: *primitive,* such as the beliefs of the Mañgyans of Mindoro, the Tagbanwas of Palawan, and the Ilongots of northern Luzon; *mediocre,* as the beliefs of the pagan tribes of Mindanao; and *highly developed,* such as the elaborate polytheisms of the Ifugaos, Igorots, Kalingas, and the other peoples of the Mountain Province in Luzon.

Most of the myths and legends recorded here were collected by men well acquainted with the dialect of the people from whom the myth or legend was obtained; they are, therefore, of much greater value than if they had been secured through interpreters.

I shall next discuss a few myths from each of the classes just mentioned.

PRIMITIVE BELIEFS

Our knowledge of the more primitive tribes of the Philippines is very limited and is chiefly confined to the material culture, together with a few of the more obvious social traits. Nothing like a complete study of any one of these tribes has ever been made. Of the Ilongots, most of our knowledge [2] is contained in the records of the early Spanish missionaries of the first part of the 18th century, at which time an extensive exploration of the Ilongot country was made.[3] There are two modern sources of information: a paper by Worcester,[4] which deals chiefly with the material culture, and the notes of Dr. William Jones, who was killed while studying the ethnology of this people. Dr. Jones' notes are now in the possession of the Field Museum,

[2] A complete bibliography cannot be given within the limits of this paper, but a number of the most important printed titles and manuscripts have been cited.

[3] Blair and Robertson, The Philippine Islands. Cleveland (1906), 37; (1907), 48.

[4] *This Journal* (1906), 1, 812–818. Many plates illustrating Ilongot types and culture are given.

Chicago, and have not yet been published. Relating to the Mañgyans, there are three important papers by Worcester,[5] Gardner,[6] and Miller,[7] but these likewise deal chiefly with the material and general social culture, and give only fragmentary notes regarding the religious beliefs. Two papers, one by Worcester[8] and one by Venturello,[9] relate to the Tagbanwas. The religion of these people is interesting, although primitive. The general character of their beliefs may be seen by the following quotation from Worcester:[10]

> I was especially interested in their views as to a future life. They scouted the idea of a home in the skies, urging that it would be *inaccessible*. Their notion was that when a Tagbanua died he entered a cave, from which a road led down into the bowels of the earth. After passing along this road for some time, he came suddenly into the presence of one Taliákood, a man of gigantic stature, who tended a fire which burned forever between two tree-trunks without consuming them. Taliákood inquired of the new arrival whether he had led a good or a bad life in the world above. The answer came, not from the individual himself, but from a *louse* on his body.
>
> I asked what would happen should the man not chance to possess any of these interesting arthropoda, and was informed that such an occurrence was unprecedented! The louse was the *witness*, and would always be found, even on the body of a little dead child.
>
> According to the answer of this singular arbiter, the fate of the deceased person was decided. If he was adjudged to have been a bad man, Taliákood pitched him into the fire, where he was promptly and completely burned up. If the verdict was in his favour, he was allowed to pass on, and soon found himself in a happy place, where the crops were always abundant and the hunting was good. A house awaited him. If he had died before his wife, he married again, selecting a partner from among the wives who had preceded their husbands; but if husband and wife chanced to die at the same time, they remarried in the world below. Every one was well off in this happy underground abode, but those who had been wealthy on earth were less comfortable than those who had been poor. In the course of time sickness and death again overtook one. In fact, one died seven times in all, going ever deeper into the earth and improving his surroundings with each successive inward migration, without running a second risk of getting into Taliákood's fire.
>
> I could not persuade the Tagbanuas to advance any theories as to the nature or origin of the sun, moon, and stars. Clouds they called "the breath of the wind."

[5] The Philippine Islands and Their People. New York (1898), 362–434.

[6] A typewritten manuscript of 60 pages, entitled "The Hampáñgan Mañgyans of Mindoro" by Dr. Fletcher Gardner. U. S. A. (1905). In the records of the division of ethnology, Bureau of Science, Manila.

[7] *This Journal, Sec. D* (1912), 7, 135–156.

[8] *Loc. cit.*, 76–122.

[9] *Smithsonian Misc. Colls.* (Paper No. 1700), 48, 514–558.

[10] *Loc. cit.*, 109–111.

They accounted for the tide by saying that in a far-distant sea there lived a gigantic crab: when he went into his hole the water was forced out, and the tide rose; when he came out the water rushed in, and the tide fell. The thing was simplicity itself.

I asked them why the monkey looked so much like a man. They said because he *was* once a man, who was very lazy when he should have been planting rice. Vexed at his indolence, a companion threw a stick at him which stuck into him; whereupon he assumed his present form, the stick forming his tail.

From the foregoing, it is evident that the Tagbanwa beliefs are not highly developed. However, several items are of interest for comparison with the beliefs of the more cultured tribes to be later described. Of these items, those most to be kept in mind are the idea of a seven-storied underworld, and the name of the chief deity of that underworld, Taliákud. This name comes from the stem *tákud, túkud,* or *tókod,* which is common to many Philippine dialects and means "post" or "support." It is generally applied to the four legs or posts of the common Philippine house. Now, the belief in an Atlas, or god who supports the earth world, is widespread in the Philippines, and the name applied to this god is nearly always derived from this same stem *túkud.* The Ifugao Atlas is Tinúkud of the underworld, and I suspect that the Tagbanwa Taliákud of the underworld is a deity of the same character.

BELIEFS OF THE PAGAN TRIBES OF MINDANAO

The interior of Mindanao is occupied by some ten pagan tribes, the most important being the Manóbos, Mandayas, Atás, Bagóbos, Biláns, Tirurais, and Subánuns. These tribes are all remarkably alike in culture; much more so, in fact, than any other similar group of peoples in the Philippines; and this culture shows a close resemblance to that of the tribes in the interior of Borneo. In the development of their myths and of their religious beliefs, these peoples occupy a middle position between the more primitive and the highest developed types of the Philippines. John M. Garvan has recently completed a very extensive study of the Manóbo peoples of the Agusan Valley, in eastern Mindanao, and the following beliefs and myths are quoted from his unpublished notes.

ORIGIN OF THE EARTH AND ITS INHABITANTS

The story of the creation of the world is variable throughout the whole Agúsan Valley. In the district surrounding Talakógon, the creation is attributed to *Makalíduñg,* the first great Manóbo. The details of his great work are very meager. He set it up on posts (some say iron posts) with one in the center. At the central post he has his abode, in company with

a python, according to the version of some, and whenever he feels displeasure toward men, he shakes the post, thereby producing an earthquake, and at the same time intimating to man his anger. It is believed that, should the trembling continue, the world would be destroyed.

In the same district it is believed that the sky is round and that its extremities are at the limits of the sea. Somewhat near these limits is an enormous hole called *the navel of the sea* through which the waters descend.

It is said that in the early days of creation the sky was low, but that one day a woman, while pounding rice, hit it with her pestle and it ascended to its present position.

Another version of the creation, prevalent among the Manóbos of the Argauan and Híbuñg Rivers, gives the control of the world to *Dágau*, who lives at the four fundamental pillars in the company of a python. Being a woman, Dágau dislikes the sight of human blood, and when it is spilled upon the face of the earth she incites the huge serpent to wreathe itself around the pillars and shake the world to its foundations. Should she become exceedingly angry, she diminishes the supply of rice either by removing it from the granary or by making the soil unproductive.

Another variation of the story to be heard on the Upper Agúsan, Simulau, and Umayan Rivers, has it that the world is like a huge mushroom and that it is supported upon an iron pillar in the center. This pillar is controlled by the higher and more powerful order of *diuwáta*, who on becoming angered at the actions of men manifest their feelings by shaking the pillar and thereby reminding men of their duties.

Three points in the beliefs just mentioned should be kept in mind. *First*, the recurrence of the idea that the earth world is supported by a post created by the chief deity and near which he dwells. *Second*, the belief in the *púsod nañg dágat*, or "navel of the sea," which is common to all of the pagan tribes of Mindanao and was also known by the ancient Bisáyas, Tagálogs, and other peoples now Christianized. It is extremely probable that this belief originated from some great whirlpool, known to the ancestors of the Philippine peoples or passed by them on their voyages.[11] *Third*, the belief that the sky was once very near the earth, and was raised to its present position by some deity. This belief is also common in northern Luzon.

The idea of the origin of curious-shaped rocks, hills, or mountains by petrifaction of some living animal or plant is common in the Philippines. Garvan gives the two following Manóbo legends of this character:

THE PETRIFIED CRAFT AND CREW OF KÁGBUBÁTAÑG

In the old, old days a boat was passing the rocky promontory of Kágbubátañg.[12] The occupants espied a monkey and a cat fighting upon the

[11] I am informed by Dr. N. M. Saleeby that this myth is also known among the Malays of Sumatra and the Malay Peninsula.

[12] Kágbubátañg is a point within sight of the town of Placer, eastern Mindanao.

summit of the cliff. The incongruity of the thing suggested itself to them, and they began to give vent to derisive remarks, addressing themselves to the brute combatants, when, lo and behold! they and their craft were turned into rock. To this day the petrified craft and crew may be seen placed upon the promontory, and all who pass must make an offering,[13] howsoever small it be, to their vexed souls. To pass the point without making an offering might arouse the anger of its petrified inhabitants, and render the traveler liable to bad weather and rough seas.[14]

The imitation of frogs is especially forbidden, for it might be followed not merely by thunderbolts but also by petrifaction of the offender, and in proof of this is adduced the legend of *Añg̃ó* of *Binaoi*.[15]

THE LEGEND OF AÑGÓ, THE PETRIFIED MANÓBO

Añg̃ó lived many years ago on a lofty peak with his wife and family. One day he hied him to the forest with his dogs in quest of game. Fortune granted him a fine big boar, but he broke his spear in dealing the mortal blow. Upon arriving at a stream, he sat down upon a stone and set himself to straightening out his spear. The croaking of the nearby frogs attracted his attention, and, imitating their shrill gamut, he boldly told them that it would be better to cease their cries and help him mend his spear. He continued his course up the rocky torrent, but noticed that a multitude of little stones began to follow behind in his path. Surprised at such a happening, he hastened his steps. Looking back he saw bigger stones join in the pursuit. He then seized his dog, and in fear began to run, but the stones kept in hot pursuit, bigger and bigger ones joining the party. Upon arriving at his sweet-potato patch, he was exhausted and had to slacken his pace, whereupon the stones overtook him and one became attached to his finger. He could not go on. He called upon his wife. She with the young ones sought the magic lime[16] and set it around her husband, but all to no avail for his feet began to turn to stone. His wife and children, too, fell under the wrath of *Anítan*. The following morning they were stone up to the knees, and during the following three days the petrifying continued from the knees to the hips, then to the breast, and then to the head. Thus it is that to this day there may be seen on Binaoi peak the petrified forms of Añg̃ó and his family.[17]

The sun, moon, and stars are great deities, or the dwelling place of such deities, in nearly all Philippine religions. The following Manóbo myth is interesting because of its resemblance to others from northern Luzon.

[13] The offering may be very small, even a little piece of wood, and is thrown overboard while passing the point.

[14] There is said to be a similar locality near Taganíto, eastern Mindanao.

[15] Binaoi is the name of an oddly shaped peak at the source of the River Añg̃dánan, tributary of the River Wáwa, Agúsan Valley.

[16] Limes and lemons are said to be objects of fear to the *búsao*.

[17] Garvan suggests these stories as illustrations of punishment following the imitating or making fun of animals, acts which are strictly tabú in Manóbo culture.

THE ORIGIN OF THE STARS AND THE EXPLANATION OF SUNSET AND SUNRISE

It is said that in the olden time the Sun and the Moon were married. They led a peaceful, harmonious life. Two children were the issue of their wedlock. One day the Moon had to attend to one of the household duties that fall to the lot of a woman, some say to get water, others say to get the daily supply of food from the fields. Before departing, she crooned the children to sleep and told her husband to watch them but not to approach lest by the heat that radiated from his body he might harm them. She then started upon her errand. The Sun, who never before had been allowed to touch his bairns, arose and approached their sleeping place. He gazed upon them fondly, and, bending down, kissed them, but the intense heat that issued from his countenance melted them like wax. Upon perceiving this he wept and quietly betook himself to the adjoining forest in great fear of his wife.

The Moon returned duly, and after depositing her burden in the house turned to where the children slept but found only their dried, inanimate forms. She broke out into a loud wail, and in the wildness of her grief called upon her husband. But he gave no answer. Finally softened by the loud long plaints, he returned to his house. At the sight of him the wild cries of grief and of despair and of rebuke redoubled themselves until finally the husband, unable to soothe the wife, became angry and called her his chattel. At first she feared his anger and quieted her sobs, but, finally breaking out into one long wail, she seized the burnt forms of her babes, and in the depth of her anguish and her rage threw them to the ground in different directions. Then the husband became angry again, and, seizing some taro leaves that his wife had brought from the fields, cast them in her face and went his way. Upon his return he could not find his wife, and so it is to this day that the Sun follows the Moon in an eternal cycle of night and day. And so it is, too, that stars stand scattered in the sable firmament, for they, too, accompany her in her hasty flight. Ever and anon a shooting star breaks across her path, but that is only a messenger from her husband to call her back. She, however, heeds it not, but speeds on her way in never-ending flight with the marks of the taro leaves[18] still upon her face and her starry train accompanying her to the dawn and on to the sunset in one eternal flight.

On myths such as these the religions of the pagan tribes of Mindanao are built up. These religions are by no means primitive, but are accompanied by sacrifices, sometimes human, and the ceremonies are performed by a well-developed priest class.[19]

[18] Some say that the spots upon the moon are a cluster of bamboos, others, that they are a *balété* tree.

[19] Our information concerning these peoples is limited, but of much interest. Besides the work of Garvan, the chief sources are the Letters of the Jesuit Fathers and a paper on the Subánuns [Christie, *Pub. P. I. Bur. Sci., Div. Ethnol.* (1909), 6, pt. 1]. The latter does not record any myths, but gives several song-stories about great culture-heroes which throw much light on the character of the Subánun mythology and identify it with the mythologies of the other pagan tribes of Mindanao. These hero-stories are too long to be given here.

Let us now turn to the highest type of Philippine beliefs:

THE WELL-DEVELOPED POLYTHEISTIC RELIGIONS OF NORTHERN LUZON

I shall mention chiefly the Igorot, Bontok, and Ifugao peoples, as these three, in addition to holding the highest order of beliefs, are the best developed in general material and social culture of any of the Philippine mountain tribes. The Tiñggián, Kalinga, and other tribes in that region also have religions of high type, but our information concerning them is more limited.[20]

The literature relating to the Igorot-Bontok-Ifugao group is very considerable in extent, and I shall refer only to a few of the more important papers dealing particularly with religion and mythology.

Before taking up the mythology proper, we should have some idea of the religion as a whole. These peoples believe that the regions of the sky world, earth world, and underworld are peopled by an almost incalculable number of deities of varying character and powers. Some of these deities are the great beings who inspire the phenomena of nature, while others are guardian spirits, messenger spirits, or mischievous tricksters. The great nature deities are mostly of malevolent character, and are much feared. Ancestral souls and the souls of sacred animals are looked upon as mediators between gods and men. Pigs and chickens are sacrificed to the deities, and other articles of food and drink are provided for them. Many elaborate religious feasts and ceremonies are held at which priests officiate. The priests form a well-defined class, and in some districts there are also priestesses. A religious ceremony is required for every important act of life, and the priests and priestesses are usually busy people.

It would seem that a religion of this same general type was also common among the lowland peoples of the Philippines before they were Christianized by the Spaniards. Pigafetta, the first European to write of the Philippines, describes a ceremony, which he saw performed in Cebu in the year 1520, as follows:[21]

[20] The Tiñggiáns, or Itnegs, should be excepted, as there are important and accurate accounts of these people by Gironière, Reyes, Worcester, Cole, and others.

[21] According to the translation by James A. Robertson in Blair and Robertson, The Philippine Islands (1906), 33, 167–171.

In order that your most illustrious Lordship may know the ceremonies that those people use in consecrating the swine, they first sound those large gongs. Then three large dishes are brought in; two with roses and with cakes of rice and millet, baked and wrapped in leaves, and roast fish; the other with cloth of Cambaia and two standards made of palm-tree cloth. One bit of cloth of Cambaia is spread on the ground. Then two very old women come, each of whom has a bamboo trumpet in her hand. When they have stepped upon the cloth they make obeisance to the sun. Then they wrap the cloths about themselves. One of them puts a kerchief with two horns on her forehead, and takes another kerchief in her hands, and dancing and blowing upon her trumpet, she thereby calls out to the sun. The other takes one of the standards and dances and blows on her trumpet. They dance and call out thus for a little space, saying many things between themselves to the sun. She with the kerchief takes the other standard, and lets the kerchief drop, and both blowing on their trumpets for a long time, dance about the bound hog. She with the horns always speaks covertly to the sun, and the other answers her. A cup of wine is presented to her of the horns, and she dancing and repeating certain words, while the other answers her, and making pretense four or five times of drinking the wine, sprinkles it upon the heart of the hog. Then she immediately begins to dance again. A lance is given to the same woman. She shaking it and repeating certain words, while both of them continue to dance, and making motions four or five times of thrusting the lance through the heart of the hog, with a sudden and quick stroke, thrusts it through from one side to the other. The wound is quickly stopped with grass. The one who has killed the hog, taking in her mouth a lighted torch, which has been lighted throughout that ceremony, extinguishes it. The other one dipping the end of her trumpet in the blood of the hog, goes around marking with blood with her finger first the foreheads of their husbands, and then the others; but they never came to us. Then they divest themselves and go to eat the contents of those dishes, and they invite only women (to eat with them). The hair is removed from the hog by means of fire. Thus no one but old women consecrate the flesh of the hog, and they do not eat it unless it is killed in this way.

This ceremony, almost the same as described by Pigafetta, is in use among the Ifugaos to-day, although it is performed by men instead of by women and differs in a few minor details.

I shall next discuss the religion and mythology of the Igorots, Bontoks, and Ifugaos, treated separately and in more detail.

THE IGOROTS

These people occupy the subprovinces of Benguet, Lepanto, and Amburayan in the Mountain Province. The region of their purest culture is in northern Benguet and eastern Lepanto. Of the religion of this region, we have considerable information from the writings of Fr. Angel Perez, an Augustinian missionary; Sr. Sinforoso Bondad of Cervantes, Lepanto; and a number of personal observations made by myself.

The sun gods, and the deities of the sky world in general, occupy the most important place in the Igorot religion. Place-spirits and animal deities are likewise highly developed. At a place called Kágubátan,[22] at the foot of the sacred mountain Múgao in eastern Lepanto, is a small lake full of sacred eels which the people guard with great care. They believe that if these eels were killed the springs would all dry up and they would have no water for their terraced rice fields. The eels are fed every day with rice and sweet potatoes by the children of the village, who, as they approach the lakelet, sing a peculiarly sweet and mournful song, upon hearing which the eels all rise to the surface of the water and approach the shore to receive their food.

The Igorots have both priests and priestesses, and they perform many public and private ceremonies, both for the benefit of the great deities and for the countless minor spirits which inhabit the sacred mountains, cliffs, groves, trees, and bushes that are scattered throughout the Igorot country. Sacrifices of pigs or chickens are made at every ceremony. The ceremonies of the common people are more or less of a private nature, but those of the aristocracy and of wealthy men are nearly always public and general. The greatest ceremonies are those connected with war and marriage and the great public festival which proves a man's right to the title of nobility.

The Igorots have a high code of morals which is closely associated with their religious belief. They also have a scientific calendar and a considerable knowledge of astronomy which has effected many modifications in their religion. Their mythology is extensive, and they have a rich unwritten literature of epic poems, hero-stories, and historical legends. Most of the myths are too long to be given here, but for purposes of comparison I give the following short one which was collected by the Dominican, Fr. Mariano Rodriguez:

It has been mentioned above that among their tales and stories they preserve a tradition relating to their origin and beginning, after a great and dreadful flood which, a very long time ago, as their old people relate, covered the earth. All the inhabitants except a brother and sister were drowned. The brother and sister, though separated from each other, were saved, the woman on the summit of the highest mountain in the District of Lepanto, called Kalauítan, and the man in a cave of the same mountain.

[22] Note the similarity of this place-name to the Kágbubátañg of the Manóbo legend, p. 89.

After the water had subsided, the man of the cave came out from his hiding place one clear and calm moonlight night, and as he glanced around that immense solitude, his eyes were struck by the brightness of a big bonfire burning there on the summit of the mountain. Surprised and terrified, he did not venture to go up on the summit where the fire was, but returned to his cave. At the dawn of day he quickly climbed toward the place where he had seen the brightness the preceding night, and there he found huddled up on the highest peak his sister, who received him with open arms. They say that from this brother and sister so providentially saved, all the Igorots that are scattered through the mountains originated. They are absolutely ignorant of the names of those privileged beings, but the memory of them lives freshly among the Igorots, and in their feasts, or whenever they celebrate their marriages, the aged people repeat to the younger ones this wonderful history, so that they can tell it to their sons, and in that way pass from generation to generation the memory of their first progenitors.[23]

This myth of the great flood, and of the brother and sister who survived it, is common throughout northern Luzon. It is most highly developed by the Ifugaos, as we shall later see.

THE BONTOKS

The Bontoks are sometimes wrongly called Igorots, but have no more right to that name than have the Ifugaos. They are a distinct people, occupying a part of the subprovince of Bontok. They are in some respects unique, and possess certain social institutions and traits which have not been found elsewhere in the Philippines. Most of our information concerning them is contained in the monograph by Jenks;[24] in the bulky volume on the language by Seidenadel;[25] and in my own observations on the general culture and ethnology of the Bontoks. Jenks' monograph is excellent as an economic paper, but the few myths given are mostly children's stories. Seidenadel [26] gives several myths in the form of texts, and some of these I have freely translated as follows:

[23] Translated by Roberto Laperal from "Igorrotes," by Angel Perez. Manila (1902), 319–320.

[24] Jenks, Albert Ernest, The Bontoc Igorot, *Pub. P. I. Ethnol. Surv.* (1905), 1.

[25] Seidenadel, Carl Wilhelm, The First Grammar of the Language Spoken by the Bontoc Igorot, with a Vocabulary and Texts. The Open Court Publishing Co., Chicago (1909).

[26] *Opus. cit.*, 485–510. Seidenadel gives an interlinear literal translation, which is, in some places, slightly inaccurate. I have made a new free translation directly from the Bontok. The text was told in the form of a story rather than that of a myth, and contains much extraneous matter which I have omitted.

STORIES ABOUT LUMÁWIG

The sons of Lumáwig went hunting. In all the world there were no mountains, for the world was flat, and it was impossible to catch the wild pigs and the deer. Then said the elder brother: "Let us flood the world so that mountains may rise up." Then they went to inundate at Mabúd-bodóbud. Then the world was flooded. Then said the elder brother: "Let us go and set a trap." They used as a trap the head-basket at Mabúd-bodóbud. Then they raised the head-basket and there was much booty: wild pigs and deer and people—for all the people had perished. There were alive only a brother and sister on Mt. Pókis. Then Lumáwig looked down on Pókis and saw that it was the only place not reached by the water, and that it was the abode of the solitary brother and sister. Then Lumáwig descended and said: "Oh, you are here!" And the man said: "We are here, and here we freeze!" Then Lumáwig sent his dog and his deer to Kalauwítan to get fire. They swam to Kalauwítan, the dog and the deer, and they got the fire. Lumáwig awaited them. He said: "How long they are coming!" Then he went to Kalauwítan and said to his dog and the deer: "Why do you delay in bringing the fire? Get ready! Take the fire to Pókis; let me watch you!" Then they went into the middle of the flood, and the fire which they had brought from Kalauwítan was put out! Then said Lumáwig: Why do you delay the taking? Again you must bring fire; let me watch you!" Then they brought fire again, and he observed that that which the deer was carrying was extinguished, and he said: "That which the dog has yonder will surely also be extinguished." Then Lumáwig swam and arrived and quickly took the fire which his dog had brought. He took it back to Pókis and he built a fire and warmed the brother and sister. Then said Lumáwig: "You must marry, you brother and sister!" Then said the woman: "That is possible; but it is abominable, because we are brother and sister!" Then Lumáwig united them, and the woman became pregnant. They had many children * * * and Lumáwig continued marrying them. Two went to Maligkoñg and had offspring there; two went to Gináañg and had offspring there; and the people kept multiplying, and they are the inhabitants of the earth * * *. Moreover, there are the Mayinit-men, the Baliwañg-men, the Tukúkan-men, the Kaniú-men, the Barlig-men, etc. Thus the world is distributed among the people, and the people are very many! * * *

Another story runs as follows:

The brother-in-law of Lumáwig said to him: "Create water, because the sun is very hot, and all the people are thirsty!" Then said Lumáwig: "Why do you ask so much for water? Let us go on," he continued, "I shall soon create water." Then they went on, and at last his brother-in-law said again: "Well, why do you not create water? It should be easy, if you are really Lumáwig!" Then said Lumáwig: "Why do you shame me in public?" And then they quarreled, the brothers-in-law. Then they climbed on up the mountain, and at last the brother-in-law said

again: "Why do you care nothing because the people are thirsty, and you do not create water?" Then said Lumáwig: "Let us sit down, people, and rest." Then he struck the rock with his spear, and water sprang out. Then he said to the people: "Come and drink!" And his brother-in-law stepped forth to drink, but Lumáwig restrained him, saying: "Do not drink! Let the people drink first, so that we shall be the last to drink." And when the people had finished drinking, Lumáwig drank. Then he said to his brother-in-law: "Come and drink." Then the brother-in-law stooped to drink, and Lumáwig pushed him into the rock. Water gushed out from his body. Then said Lumáwig: "Stay thou here because of thy annoying me!" Then they named that spot *ad Isik*." Then the people went home; and the sister of Lumáwig said to him: "Why did you push your brother-in-law into the rock?" Then said Lumáwig: "Surely, because he angered me!" Then the people prayed and performed sacrifices. * * *

In the above stories we see the recurrence of the flood myth and the origin of fire, or rather the manner in which men received it. The story of bringing water out of a rock is interesting, and occurs again in Ifugao mythology in a slightly different form. It is possible, of course, that this is a biblical story which was brought in by some wandering Christians several generations past; but the flood legend is certainly native, and I see no good reason why the story of the miraculous drawing of water from a rock should not also be a native development in spite of its similarity to the Hebrew myth.

The Bontoks have hundreds of myths and stories about Lumáwig, who corresponds to the Ifugao Líddum, who is the good god who gave men fire, animals, plants, and all the useful and necessary articles of daily life. These myths are of great value, and it is to be hoped that a full collection of them will some day be made.

The Bontok religion is, on the whole, somewhat less developed than that of the Igorots and Ifugaos. The same general beliefs are held, however, and the ceremonial life is similar. Priests are the rule, rather than priestesses; and the same sacred animals are used, as in the other areas. In the social organization, the clan system is in a more perfect state of development than among any other people in the Philippines.

I shall now take up the last religion to be discussed, and the one which is at the same time the most highly developed:

" Place of anger.

THE RELIGION AND MYTHOLOGY OF THE IFUGAO PEOPLE OF NORTHERN LUZON [28]

The subject of the Ifugao religion is an extensive one, and I have no intention of discussing it in detail here. I shall merely give a few general facts, and a few of the more interesting myths. In addition to some minor papers by the Dominican fathers Malumbres and Campa, most of our information concerning the Ifugao religion is contained in three extensive manuscript monographs.[29] The myths that I shall give here are selected from the first and third of these manuscripts, and the general facts are taken from all three.

BELIEFS AND MYTHS OF THE KIÁÑGAN IFUGAOS

The Ifugao conception of the universe differs considerably in the different religious districts.[30] The Western Ifugao and Central Ifugao beliefs are closely associated, but stand quite apart from those of Kiáñgan Ifugao. The people of the latter area think of the universe as being composed of a large number of horizontal layers which are very similar one to the other. The upper face of each of these layers is of earth, while the

[28] There are about 127,000 Ifugaos, nearly all living in the subprovince of Ifugao. They are divided into a large number of hereditary clans, each of which has its own social and political organization. They are an agricultural people, and have developed their great stone-faced terraced rice fields to an extent probably not equaled elsewhere in the world. I do not believe that the physical type, language, or culture of these people is wholly a native development. The evidence seems to indicate that the present-day Ifugaos are the result of mixture, perhaps one or more thousand years ago, of several widely different native types with an incoming people of high culture. Indications seem to point to the highlands of Burma as the original home of this highly-cultured people, but this is a supposition that will require proof. Within historic times the Ifugaos have been almost entirely free from mixture of any sort.

[29] 1.—"The Religious Beliefs of the Kiáñgan Ifugaos," a manuscript of some 300 pages, by Juan Fernández Villaverde, translated and annotated by myself with the assistance of Mr. John M. Garvan.

2.—"The Religion of the Kiáñgan Ifugaos," a manuscript of 350 pages, by Roy Franklin Barton, with notes by myself.

3.—Unpublished notes. "The Religion of the Central Ifugaos," a manuscript of about 300 pages, by myself.

[30] The subprovince of Ifugao may be divided into five general culture areas which can be also considered as religious districts. These are: Kiáñgan Ifugao, Western Ifugao, and Central Ifugao, speaking the Pure Ifugao dialect; and Alímît Ifugao and Mayóyao Ifugao, speaking the Sub-Ifugao dialect. (Plate I.) Very little is known of the religion of Alímît Ifugao and Mayóyao Ifugao, and they will not be further discussed in this paper.

lower face of each of them is of a smooth blue stone called *múliñg*.[31] The layer on which we live is called the Earth World (Lúta). The four layers above us constitute the Sky World (Dáya), and are called, in order from the top down, Húdog, Luktág, Hubulán, and Kabúnian. The last is the layer immediately above the Earth World, and it is the blue-stone underfacing of this layer that we call the "sky." The Under World (Dálom) consists of an unknown number of layers beneath the one on which we live. All of the layers meet in the farthest horizon,[32] where lie the mythical regions of the East (Lágud) and other places.

Some of the Kiáñgan priests seem to have developed the further idea that this Dáwi, or farthest horizon, is in the form of a great celestial globe that surrounds the universe, forming its boundary, the inside face of which can be distinguished in the hazy distance where the deep blue of the sky fades into a very light blue or whitish color.[33] The Earth World, or layer on which we live, lies approximately at the center of the universe. It is therefore the largest layer, and the layers of the Sky World and Under World grow successively smaller as they approach the zenith and nadir of the celestial globe, the boundary of the universe.[34]

The inhabitants of the universe consist chiefly of an incalculable number of greater and lesser deities and spirits.[35] In addition to these, there are the souls of men, animals, and plants.

[31] Or *búliñg* (?).

[32] Dáwi (?).

[33] It can only be seen at this point for the reason that the earth beneath and the blue-stone underfacing of Kabúnian immediately above cut off the view. Ifugao astronomical knowledge, plus the circular nature of the horizon and the apparent slope of the whitish band above it, has doubtless given rise to this belief in a celestial globe surrounding the universe.

[34] The Ifugaos have no belief, that I have ever been able to discover, as to the *origin* of the universe. To their minds it has always existed and will always continue to exist.

[35] In the three previously mentioned manuscripts on the Ifugao religion, between two and three thousand deities are spoken of by name, and this is only a fraction of the number known to the Ifugaos. Of course, only a few of them are really *great* deities, but even such may be counted by hundreds. Of the very diverse and all-inclusive character of these deities, no accurate idea can be given within the brief limits of this paper. Suffice it to say there are gods of war, of industry (such as weaving, metal-working, etc.), and of beauty and love; nature-gods, cannibalistic gods, evil deities, mythical monsters, messenger spirits, guardian spirits; and hosts of mischievous elves and fairies.

They have always existed in the various regions of the universe, and were brought to the Earth World by the gods. Men are descended from the gods of the Sky World, as we shall see in the myths.

The mythology of the Kiáñgan Ifugaos is rich and varied. As an introduction to it, I have selected the following:

ORIGIN OF THE IFUGAOS[36]

I

Origin of the mountains.—The first son of Wígan, called Kabigát, went from the sky region Húdog to the Earth World to hunt with dogs. As the earth was then entirely level, his dogs ran much from one side to another, pursuing the quarry, and this they did without Kabigát hearing their barking. In consequence of which, it is reported that Kabigát said: "I see that the earth is completely flat, because there does not resound the echo of the barking of the dogs.[37]" After becoming pensive for a little while, he decided to return to the heights of the Sky World. Later on he came down again with a very large cloth, and went to close the exit to the sea of the waters of the rivers, and so it remained closed. He returned again to Húdog, and went to make known to Boñgáboñg that he had closed the outlet of the waters. Boñgáboñg answered him: "Go thou to the house of the Cloud, and of the Fog, and bring them to me." For this purpose he had given permission beforehand to Cloud and Fog, intimating to them that they should go to the house of Baiyuhíbi,[38] and so they did. Baiyuhíbi brought together his sons Tumiok, Dumalálu, Lum-údul, Mumbatánol, and Inaplíhan, and he bade them to rain without ceasing for three days. Then Boñgáboñg called to X . . . and to Mañgiuálat, and so they ceased. Wígan said, moreover, to his son Kabigát: "Go thou and remove the stopper that thou hast placed on the waters," and so he did. And in this manner, when the waters that had covered the earth began to recede, there rose up mountains and valleys, formed by the rushing of the waters.[39] Then Boñgáboñg called Mumbá'an that he might dry the earth, and so he did.

II

The first inhabitants of the Earth World.—Such being the state of affairs, Kabigát went to hunt once again; and, while following the dogs, that were chasing a quarry, he made a thrust with his spear into a

[36] Collected by Juan Fernández Villaverde, in 1894, from a celebrated Ifugao priest, Duminóñg of Kiáñgan. Translated, corrected, and annotated by myself with the assistance of Mr. John M. Garvan.

[37] This statement is significant, as it shows an understanding of the true cause of the echo. Ifugao cosmographical and astronomical knowledge is not very primitive, as a careful study of this myth will clearly demonstrate.

[38] God of the rain.

[39] Ifugao knowledge of the part played by erosion in the formation of the topographical features of the earth is clearly shown.

spring (or fountain) at the foot of a large tree. Immediately Kabigát returned to Húdog, bringing with him the captured quarry. When he had dressed and eaten the savory game, Kabigát said to his father Wígan that he had seen on the Earth World a spring and very good and beautiful trees for timber with which to make houses, and that accordingly he was desirous of going down to live at such a delightful place. His father answered him that if he so desired he might do so.

Some time after Kabigát had departed, and after he had cut excellent timber wherewith to build a house, Wígan said to his daughter Búgan: "Look, daughter! Thy brother Kabigát is down in Kai-áñg building a house. I think that it would behoove thee to look after his meals." Búgan volunteered to descend with such a design. This intention having been carried out, she lodged herself in the upper part of the house, and her brother dwelt in the lower part.

In the meantime, Kabigát, reflecting on his solitude and want of company, and, seeing that the domestic chickens, even though related among themselves, produced other roosters and hens, resolved to know carnally his sister Búgan, during her sleep. Some time having expired, the sister noted that she had fruit in her womb. * * * Such was the sadness and melancholy that came upon her, that she did nothing else but to weep and bewail herself, and to seek by some means alleviation for her sorrow through a violent death. She pretended to her brother that she was going to look for *ísda*,[46] but what she did was to follow the course of the river until she arrived at its mouth in Lágud (the Eastern World). Upon arriving at the shore of the sea, she remained there weeping and waiting for someone to take away her life in a violent way. Soon her brother Kabigát (who had followed her) appeared there, and Búgan, upon discerning him, cast herself into the depths; but, instead of going to the bottom, she stopped at the rice granary of Ñgílîn Mañgóñgol. The brother, who witnessed the tragedy, did not stop at trifles but at once cast himself after her into the depths of the ocean, stopping, by a strange coincidence, at the very same rice granary as his fugitive sister and spouse. She continued there, bemoaning her misfortune, when, behold! Ñgílîn, hearing her plaint, approached and inquired the cause of her affliction. She related to him her trouble, how she had conceived by her carnal brother when she was asleep. Ñgílîn soothed her as follows: "Do not be afflicted, daughter, by that. Are not the fowls of Kai-áñg related among themselves, and yet they beget just like those that are not so?" The maiden became somewhat calm, but still, out of shame for what had happened, she refused to eat what Ñgílîn offered her. Then he said to her: "In order that thou mayst further assure thyself of what I tell thee, and in order that thou mayst quiet thyself, let us go and consult my elder brother Ambúmabbákal." And so they did. Ambúmabbákal, having been informed of the circumstances, burst out laughing and said to them: "Peradventure have ye not done well and righteously, there not being in existence any others but yourselves to procreate? However, for greater assurance, let us all go together to

[46] Shellfish, greens, fruits, meats, or fish that constitute the savory part of the meal, as contrasted with *kánon* which refers only to staple foods such as rice, sweet potatoes, etc.

set forth the case before Muntálog my father." Muntálog, having heard their story, applauded the conduct of the solitary brother and sister. He told them, accordingly, to calm themselves and to rest there for a few days,—and so they did.

III

The bringing of fire to the Earth World.—On the third day, Kabigát requested leave to return, but Muntálog answered: "Wait one day more, until I in my turn go to my father Mumbónañg." Muntálog found his father and mother seated facing each other; and, upon his arrival, his mother, Mumboniag, came forward and asked him: "What news do you bring from those lower regions, and why do you come?" The father also became aware of the presence of his son, through the questioning of the mother, and inquired likewise as to the reason of his coming. Muntálog answered: "I have come, father, to ask thee for fire for some Ifugaos who remain in the house of Ambúmabbákal." "My son," the father replied, "those Ifugaos of yours could not arrive at (or, come to) Mumbónañg without danger of being burned to cinders." Then he continued: "It is well! Approach me!"[41] Muntálog accordingly approached Mumbónañg, who said to him: "Seize hold of one of those bristles that stand out from my hair," and so Muntálog did, noticing that the said point faced the north, and he placed it in his hand. Then Mumbónañg said to him again: "Come nigh! Take this white part, or extremity, of the eye that looks toward the northeast, toward the place called Gonhádan." And he took it and placed it in his hand. And Mumbónañg said to him once more: "Come near again, and take the part black as coal, the dirt of my ear which is as the foulness of my ear." And so he did. Then Mumbónañg said to Muntálog: "Take these things and bring them to thy son Ambúmabbákal and to Ñgílin, in order that the latter may give them to the Ifugaos." And he said again to Muntálog: "Take this white of my eye (flint), this wax from my ear (tinder), and this bristle or point like steel for striking fire, in order that thou mayst have the wherewith to attain what thou seekest (that is, *fire*), and to give gradually from hand to hand to the Ifugao; and tell him not to return to live in Kai-áñg, but to live in Otbóbon, and cut down the trees and make a clearing there, and then to get together dry grass; and that they make use of the steel for striking fire, holding it together in this manner, and burying it in the grass. And on making the clearing if they see that snakes, owls, or other things of evil omen approach, it is a sign that they are going to die or to have misfortunes. But if they do not approach them, it is a sign that it will go well with them in that place; that the soil will be productive, and that they will be happy."

IV

The journey to Ifugao land from the East.—Upon the return of Muntálog, at the termination of the fourth day, he said to Búgan and Kabigát: "Now ye can go but let Ñgílin and Ambúmabbákal accompany

[41] Mumbónañg has a head covered with bristles, just like a porcupine, but radiating and sharp pointed like nails facing outward to penetrate any object on the outside. He possibly represents some constellation.

you as far as the house of Liñgan,[42] in order that there they may make the cloth or clothes necessary for wrapping the child according to the usage of the Earth World."

Liñgan actually furnished to them the cloth and the seamstress to make the swaddling clothes for the child—and then they continued their journey unto the house of Ambúmabbákal. The latter said to them: "Take this cloth and this pair of fowls, male and female, and do not return to live at Kai-áhañg but go to Otbóbon." And Ambúmabbákal accompanied them to the house of Ñgílîn á Mañgóñgan[43] and said to the latter: "It will be well if we beseech the *búni*[44] to take pity on these poor people, considering the great distance that still remains to them unto Otbóbon, and keeping in mind also the great heat that prevails." So they did, saying: "Ye *búni*, take pity upon these unhappy ones and shorten for them the distance." The prayer was heard, and after two or three days they found themselves at the end of their journey.

V

The peopling of Ifugao land.—Having arrived at Otbóbon, they built a temporary hut on fertile land. Later they constructed a good house, and it was just after it was finished that Búgan gave birth to a healthy boy; and the fowls also procreated.

The child grew a little, but there came to him an unlooked-for sickness. Then Kabigát remembered that Ambúmabbákal had advised them to offer fowls to their ancestors in case any sickness should come upon them. So they killed a rooster and a hen, and offered them to Ampúal, Wigan, and their other ancestors. The child recovered and began to grow very robust and plump. They named him Balitúk. Búgan conceived again, and she gave birth to a strong girl, to whom she gave the name of Liñgan. These children grew up, and, having attained a marriageable age, were married like their parents, and gave origin to the Silipanes.[45]

Their parents, Kabigát and Búgan, had a second son, on whom they placed the name Tad-óna, and then another daughter, whom they called Inúke. She and Tad-óna did what their parents and brother and sister had done, and gave birth to Kabigát, the second, and Búgan, the second. These latter two, imitating the preceding ones, were united in wedlock and begot sons and daughters who peopled the remainder of the Ifugao region.[46]

VI

Establishment of religious ceremonies.—Upon their marriage Tad-óna and Inúke did not offer pigs or fowls to the *búni* as was customary. This being observed by Líddum from Kabúnian, he descended and asked them: "Why have ye not offered sacrifices?" They answered him that they were ignorant of such a custom or ceremony. Then Líddum returned to Ka-

[42] The goddess of weaving.

[43] Or *Ñgílin an Maknóñgan* (?).

[44] Deities which the Ifugaos believe to be their ancestors.

[45] The people of Alímît Ifugao. (Plate I.)

[46] Tad-óna and Inúke are recognized as common ancestors by all the Kiáñgan Ifugaos, and the myths about them are legion.

búnian and brought them the yeast with which to make *búbûd*, or wine from fermented rice; and he taught Tad-óna the method of making it, saying: "Place it in jars on the third day," and he returned to the Sky World. On the fifth day he came down again to teach them the manner of making the *mum-búni*."[47]

Some version of the above myth is known to the people of every Ifugao clan, although the details of the story vary considerably in the different culture areas. The myth is also known to the Igorots and Bontoks, as we have already seen. I have in my possession some twenty different versions that have been collected from various clans of Central, Western, and Kiañgan Ifugao. These may all be classified into two general types, one of which is represented above.[48] An example of the other type, entitled The Ifugao Flood-Myth, is given later in this paper under the heading Central Ifugao Beliefs.

The god Wígan is one of the greatest and best known figures in Ifugao mythology. He has three sons, Kabigát, Balitúk, and Ihîk, and one daughter, Búgan. The following story about Ihîk is especially interesting because of its resemblance to one of the Bontok myths previously given.

THE STORY OF IHÎK[49]

Ihîk nak Wígan, in company with his brothers Kabigát and Balitúk, went to catch fish in the canal called Amkídul at the base of Mt. Inúde. After catching a supply of fish, they strove to ascend to the summit of the mountain; but, ever as they went up, Ihîk kept asking his brothers for water to satiate his devouring thirst. They answered him: "How can we find water at such an elevation? Water is found at the base of the mountains but not at their summits!" But Ihîk kept on importuning them. At last, when they were in the middle of their ascent, they came to an enormous rock. Balitúk struck the rock with his spear, and instantly there burst forth a large jet of water.

Ihîk desired to drink first but they deterred him, saying: "It is not just that thou shouldst drink first, being the last born of us brothers!" Then Kabigát drank, and afterwards Balitúk. Just as Ihîk was about to do so, Balitúk seized him and shoved the whole of his head under the rock, adding: "Drink! Satiate thyself once for all, and serve henceforth as a tube for others to drink from!" And so it came to pass that Ihîk on receiving the water through his mouth sent it forth at the base of his trunk. He said to his brothers: "You are bent on making me take the part of a water-spout! I shall do so, but bear in mind that I shall

[47] Ceremonies to the *búni*, accompanied by prayers and sacrifices.

[48] A version of the same type, but very different in detail, is contained in the unpublished notes of Mr. Roy Franklin Barton. I have also several others from the same area (Kiáñgan Ifugao) that were collected by Lieut. Maximo Meimban.

[49] For bibliographical reference, see Villaverde, *loc. cit.*

also take just vengeance on your descendants for this injury." In view of this threat, Kabigát and Balitúk did not dare to make use of the improvised fountain, and so they returned home.

This myth, which is very long, then relates how certain of the great deities befriended Ihîk by setting him free and assisting him in obtaining vengeance on his brothers and their descendants.

Another myth, showing an interesting resemblance to a Manóbo myth already given, tells how the sky region of Manaháut,[50] which was once very near the Earth World, was raised to its present position. The cannibalistic and voracious appetite of Manaháut was causing the slow extermination of the human race,[51] and the aid of the gods was invoked. The Ifugaos have a number of powerful deities who always remain in a sitting posture. One of these suddenly rose up, and, with his head and shoulders, thrust the sky region of Manaháut to a vast height above the earth, thereby preventing the extermination of the people.[52]

As a final example of Kiáñgan Ifugao mythology, I give the following story which is one of the best specimens of Ifugao literature.

THE STORY OF BÚGAN AND KIÑGÁUAN, OR THE MARRIAGE OF A GODDESS WITH A MAN[53]

The wife of the god Hinumbían is Dakáue. She has no children except a daughter called Búgan. This Búgan was with her parents in Luktág. Let it be noted that these divinities of the highest region of the Sky World do not see directly that which takes place in the lower spheres, but the first calls the second, and the second the third, etc.

[50] Manaháut is the greatest and most hated *evil* deity of the Ifugaos.

[51] The memory of cannibalism so common in Ifugao mythology possibly dates back to a period of contact with human cannibals.

[52] The Ifugao version of the story states that the sky was so low that it interfered with the plying of the spear, while the Manóbo story relates that the rice pestle would strike against it. It is possible that this myth dates back to cave-dwelling ancestors—for the low roof of a cave would be an inconvenience of the same character as that which is here ascribed to the sky.

A further proof of this is the following Tagálog myth furnished me by Mr. Roberto Laperal: "In former times the sky was very low and could be touched with the hand; when men were playing, they would strike their heads against it whenever they jumped upward. This made them impatient, and one day they began to throw stones at the sky. The great god Bathala was very angry and removed the sky to its present position."

[53] For bibliographical reference, see footnote 36. A less complete version of this myth, differing somewhat in detail, is given by Barton in the second manuscript mentioned in footnote 29.

According to this order, the first or principal god, known as Buñgóñgol, charges or gives orders to his son Ampúal, who in turn orders his son Balittíon, and the latter orders and charges Líddum of the lowest sky region, or Kabúnian. This Líddum is the one that communicates directly with the Ifugaos. The said Búgan, daughter of Hinumbían, was at that time a maiden, while in Luktág, and her uncle Baiyuhíbi[64] told her to go down and amuse herself in the third sky region, Hubulán. So, according to the wishes of her relatives, she went down to Hubulán where Dologdógan, the brother of Balittíon, was. The said Dologdógan had gone to Hubulán to marry another Búgan. The first Búgan, daughter of Hinumbían, had been advised to marry in Luktág, but she did not wish to do so, and so they told her to go off and divert herself in Hubulán. Having settled down in this sky region, her uncles advised her to get married there, but neither did she wish this. In view of her attitude on this question, Dologdógan exhorted her to descend to Kabúnian, and go to take her abode in the house of Líddum her relative and the son of Amgalíñgan. The said Líddum wished her to marry in Kabúnian, but she also refused to do this. Near the house, or town, of Líddum (whose wife is called Líñgan) there was a village called Habiátan, and the lord of the village also bore this name. Such being the case, the said Habiátan went to the house of Líddum, and, upon seeing the young Búgan in the condition of maidenhood, he asked Líddum: "Why does this maid not marry?" The former answered him: "We have counseled her to it, but she does not wish to do so. I, upon seeing that she did not wish to get married, nor to follow my advice, said to her: 'Why dost thou not get married?' She began to laugh. I replied: 'Then, if thou dost not wish to get married in Kabúnian, it were better for thee to return to thy people and thy family of Luktág,' but she answered: 'That is not necessary, and I should like to stay with thee in thy house—and I shall take care to get married at my pleasure, when I see or meet someone of my liking, and then I shall tell thee.'" Habiátan, after hearing this story of Líddum, said to him: "According to this, I shall take the young Búgan to my *rancheria* and house in Habiátan to see if she wishes to marry my son Bagílat."[65] To which Líddum rejoined: "If Búgan so desire, it goes without saying that she can accompany thee at once." The maiden having been consulted, assented, and went off with Habiátan to his house and village. Having arrived at the said place, and after Búgan had observed somewhat the young Bagílat, as if Habiátan had asked her whether she desired to marry him, she answered: "How am I to wish to marry him (Bagílat), grim and fierce as he is, and making use of such an extraordinary spear! Moreover, he never stops—but is always running around in all parts of the Sky World, through the north and the south, through the east and the west;" and she told Habiátan that she did not wish to marry his son Bagílat, the Lightning, because that through his effects he harmed plants, fruits, and possibly might injure even herself. Then said Habiátan: "Thou art somewhat fastidious, and I see that thou couldst with great difficulty get married in these regions; it would be better that thou return once more to thy land." She answered that she did not desire to return any more to her people, and that accordingly she would betake

[64] God of the rain. [65] God of the lightning.

herself to some other point more to her liking. This dialogue being completed, she went down from the house of Habiátan, and, casting a glance at the four cardinal points, she saw that the weather was clear and calm, and descried on the Earth a place called Pañgagáuan, over (or on) Umbuk, where there was an Ifugao called Kiñggáuan—a young man, unmarried, naked, and without a clout (which he had thrown away because of its age), because he was engaged in making pits, or wells, for catching deer with a trap (according to the custom)—and there he had a hut. Upon seeing him Búgan exclaimed: "Oh! the poor man! and how unfortunate!" And, hiding the occurrence from Habiátan, she determined to return to her sky region of Luktág in order to manifest to her father, Hinumbían, that it was her desire to descend to the Earth World in order to get married with that poor Ifugao.

The paternal permission having been obtained, she made ready the necessary provisions—consisting of a vessel of cooked rice and a clout (or *bahág*). In this fashion she proceeded to Kiñggáuan's hut and entered it, saying: "Who is the owner of this hut?" "I," answered Kiñggáuan, "but I am ashamed to approach thee, because thou art a woman and I am naked." To which she replied: "Never mind! because here I have a clout for thee." But he did not approach for shame; and so she threw him the clout from afar, in order that he might cover himself. The surprised man expressed to her his astonishment, saying: "Why dost thou approach here, knowing that the appearance of a woman, when men are engaged in such an occupation, is of evil omen for the hunt?"[86] And she replied to him: "By no means shall it come to pass as thou thinkest, but, on the contrary, thou shalt be extremely lucky in it. For the present let us eat together, and let us sleep this night in thy hut. To-morrow thou shalt see how lucky we are in the hunt." The following day, upon going to visit the pits, they actually found them full. Kiñggáuan killed the quarry and spent the rest of the day in carrying the carcasses to his hut. He kept alive only two little pigs, a male and a female, which he delivered to Búgan that she might tie them in the dwelling-place while he was bringing in the rest of the dead game. On the second day Búgan asked the solitary one: "Why dost thou dwell in such evil places?" Kiñggáuan answered her: "Because my parents are so parsimonious in giving me what I need." Then said Búgan to him: "Let us go to Kiáñgan," and he consented. Leaving, then, the dead game in the hut, they carried with them only the two live "piglets." Kiñggáuan carried the male one, and Búgan the female one—arriving at the above-mentioned place on the nightfall of the second day.

Having arrived at Kiáñgan, they took up their lodging in the house of Kiñggáuan's mother—the man entering first and then Búgan. The mother of the former was surprised, and asked him: "Who is this woman?" The son answered: "I was at the hunting place and she presented herself to me there and I do not know whence she comes." The aged mother after having looked at them a little while—when seated—addressed herself to Búgan and asked: "Who art thou? How dost thou call thyself? From

[86] It is a common belief, widespread in the Philippines, that the appearance of a woman at a place where men are hunting will render the search for game fruitless. J. M. GARVAN.

whence dost thou come?" The maiden replied that her name was Búgan, that she was the daughter of Hinumbían and Dakáue, and that she belonged to the sky region of Luktág. But the reason of her descent to that terraqueous region, and of accompanying her son, was her having seen him so poor and deserted * * * "for which reason I took pity on him and came down to visit him and to furnish him with an abundance of game" * * * and she added that on the following day the mother should send many people to collect the dead game which they had left in the lonely hut of her son. By a coincidence, the mother of the young man was also called Búgan, with the addition of *na kantaláo*.

During all this, the young couple had already been united in the bond of matrimony—without any of the prescribed formalities—at the place called Pañgagáuan, and Búgan gave birth to a vigorous son to whom she gave the name Balitúk. The little pigs, also, which they had brought, gave forth their fruit. The child grew a little, but he did not yet know how to walk. His mother, Búgan, as a being from the Sky World, did not eat like the rest of the people of Kiáñgan, but desired only boiled rice, birds, and meat of game. Those of that region bore her much envy because of her being a stranger; and, because they knew she did not like certain vegetables of theirs, they strove to make her depart from their town and to betake herself to her birthplace of Luktág in the sky. Their envy toward her increased upon their seeing the abundance of her fowls and pigs. With the object, then, of disgusting her, and of driving her away, they attempted to surround her house with certain garden stuffs, greens, and fish. With these they succeeded effectively in making Búgan fall sick with an intense itch and fever; for which reason she abandoned that house and went to another place, while her husband moved to a rice granary. But they persecuted her again in her new place of lodging, surrounding it with the vegetables and other things spoken of above, and causing her nausea in a stomach accustomed to other food. In view of such wearisome tricks, Búgan proposed to Kiñggáuan her desire to return to her land with the new blossom of spring, their child. Her husband answered her: "I should well like to accompany thee, but I am afraid of ascending to so high a place." "There is no reason to be afraid," replied Búgan, "I myself shall take thee up in the *áyud* (a kind of hammock)." She accordingly strove to persuade him, but Kiñggáuan did not lay aside his fear; then she attempted to take him up bound to a rope, but neither did she effect this. During these labors, she soared aloft with the child to the heights of Luktág, but upon perceiving that her husband had not followed her she went down again, with her son in the band which the Ifugaos use for that purpose. (Plate III, fig. 2.) After conferring with Kiñggáuan, she said to him: "Thou seest the situation. I cannot continue among thy countrymen, because they hate me unto death. Neither dost thou dare to ascend unto Luktág. What we can do is to divide our son," * * * and, seizing a knife, Búgan divided her son Balitúk in the middle, or just above the waist, and made the following division: The head and the rest of the upper trunk she left to Kiñggáuan—that it might be easier for him to give a new living being to those upper parts—and she retained for herself the lower part of the trunk unto the feet; and as for the entrails, intestines, heart, liver, and even the very excrement, she divided

them—leaving the half for her husband. The partition having been completed, Búgan mounted to her heavenly mansion, taking with her the part of her son which fell to her lot, and, giving it a breath of life, she converted it into a new celestial being retaining the very name of Balitúk. On the other hand, the part which she had left to her husband, on the earth, began to be corrupted and decayed, because he, Kiñgáuan, had not been able, or did not know how, to reanimate it. The foul odor of the putrified flesh reached unto the dwelling place of Búgan in Luktág, and, having been perceived by her, she descended to Kabúnian in order to better acquaint herself with the happening. From Kabúnian she saw that the evil odor issued from the decomposition of the part of the entrails which she had left on the earth in charge of her husband, and which he had not reanimated. Then she broke forth in cries of grief, pity, and compassion—and, descending to Kiáñgan, she severely accused Kiñgáuan, saying unto him: "Why hast thou allowed our son to rot? And why hast thou not quickened him to life?" Upon which he answered that he did not understand the art of reanimation.

Búgan endeavored to remove the greatest possible portion of the corrupted part of her son. Consequently, she changed the head of Balitúk into an owl[87]—a nocturnal bird called *akúp* by the Ifugaos—whence the origin of the Kiáñgan custom of auguring evil from this bird, and the offering of sacrifices of fowls to Búgan, in order that no harm should come to them, and that the said owl should not return to them.

The ears she threw into the forest, and for that reason there come forth on the trees certain growths, like chalk, half spherical (certain species of fungi). The nose she threw away and changed it also into a certain species of shell which attaches itself to trees. Of the half of the excrement she made the bill of a small bird called *ído*, from which the Ifugaos augur well or ill, according to certain variations of its song.[88]

From the putrified tongue she produced a malady, or swelling, of the tongue in men, which is cured with a hot egg, or with a chicken, which they offer to their mother, Búgan.

From the bones of the breast she created a venomous serpent. From the heart she made the rainbow. From the fingers she made certain very long shells, after the form of fingers. From the hair, thrown into the water, she created certain little worms or maggots. From the skin she drew forth a bird of red color, called *kúkuk*. From the half of the blood she created the small bats (*litálit*). From the liver she drew

[87] It will be noted that most of the things created by Búgan from the corrupted half of Balitúk were pests and things of evil omen to torment the people of Kiáñgan as they had tormented her.

[88] *Ído*, or *ídu*, is the Ifugao name for the omen spirits. A certain small black and white bird called *pîtpît* is believed to be an omen spirit, and therefore it is also properly called *ído*. When an Ifugao is going on a journey and sees one of these birds, or hears its cry, he immediately stops and calls out to it. He tells it where he is going and why. If the bird flies away to one side or in a forward direction, it is a good sign; but if it flies backward along the path, uttering a sharp cry of fright, it is a very bad omen, and the man will probably return home and not continue on his journey until another day.

forth a certain disease of the breast. From the intestines she formed a class of somewhat large animals, resembling rabbits or rats (*amúnin?*). From the bones of the arms she made pieces of dry or rotted wood that fall from trees upon passers-by who approach them.

The Balitúk that Búgan reanimated is in the sky region of Luktág."

The myth just given is an example of one of the most interesting processes in the early development of literature. It is probable that originally it was only a simple origin myth, but it has been elaborated and developed until now it is worthy of its little niche in the world's literature.

"I am informed by Dr. Dean S. Fansler that he obtained from an Igorot of Túblai, Benguet, in May, 1910, a myth very similar to this story of Búgan and Kiñggáuan. The details are different, but some of the more important incidents are the same and I will give a brief summary of the myth here: A god named Dumágid, whose home is in one of the lower regions of the sky, came down to the earth and lived among the people. He taught the people many things, and often went hunting with them in the forest. But one day, when he was out in the woods alone, he met a beautiful girl by the name of Dúgai with whom he fell in love, and they were married. A son was born to them, and they named him Ovug. Shortly after this Dumágid informed the people that he must return to the Sky World to make report to the chief deity, Kabigat, but that he would soon come down again to the Earth World. But the people demanded that he take his wife with him, and that they leave their son as security for their return. Dumágid told Dúgai that the path was so hot that she might die, but this the people would not believe. So Dumágid and Dúgai started out, but as they approached the sun it grew so hot that Dúgai died. Dumágid returned her body to the earth, and went on to his home in the sky. Later he came back to the earth, in company with the god Bañgan di Bai-áñgan, and told the people that he must take his son Ovug to the Sky World. This the people refused to allow him to do, so Dumágid took a knife and divided his son Ovug into equal parts by cutting him straight down. When he had done this, he told the people to keep one half and make a new boy out of it. The other half Dumágid took with him to the Sky World and reanimated it. Then he looked down to the Earth World and saw that the half of his son there was becoming decayed because the people had not given it new life. So he came down with the boy he had made, and made another beautiful boy out of the decayed half. Then he made the two boys stand before the astonished people. For their greater astonishment, Dumágid asked the boy he had made in the Sky World to talk. He spoke very loud like sharp thunder, so that the people were frightened almost to death. Then Dumágid asked the other boy to talk, and he spoke low like the rolling thunder. Then the first boy went up to the Sky World whirling like fire, and thundered there. And it is believed that this is the origin of the lightning and the sharp thunder that comes after; and it is also believed that the low thunder is the voice of the second boy, or the one made on the earth.

CENTRAL IFUGAO BELIEFS

The exact difference between the Central Ifugao and the Kiáñgan beliefs is not an easy matter to determine. There has been much mixture between the two peoples accompanied by a corresponding exchange of ideas. The effect of this exchange in some cases has been to produce a deceptive similarity in beliefs and myths that originally were fundamentally different; while in other cases myths that were originally the same have been so greatly differentiated in the two areas that their unity can scarcely be recognized.

However, it would seem that some basic differences really exist, and the probability is that they are survivals from the ancient cultures of the peoples who went to make up the present distinctly composite Ifugao group. But the evidence at hand is not sufficient to warrant a full discussion of this question here, and I shall merely cite one example. Kiáñgan myths are nearly always told from the standpoint of the gods, and have to do with the dealings of the gods with one another and with men. On the other hand, Central Ifugao myths are told from the standpoint of men in their relations and dealings with the gods. This will be made plain by a comparison of the following Central Ifugao myth with the Origin of the Ifugaos previously given.

THE IFUGAO FLOOD-MYTH [60]

I

The Golden Age.—Ifugao knowledge of the prediluvian period is very vague. It is known, however, that the Earth World was entirely flat except for two great mountains, one in the east called Amúyao and one in the west called Kalauítan.[61] This level country was heavily forested, and all of the people lived along a large river that ran through the central plain between the two great mountains.

The period was something like a Golden Age, when things were much better than they are now. The people were demigods whose life was a happy one and their country a sort of Garden of Eden. To obtain rice, all that they needed to do was to cut down a stalk of bamboo, which was plentiful, and split open the joints which were filled with hulled rice ready to cook. Stalks of sugar-cane were filled with *baiyax*,[62] and needed only to be tapped to furnish a most refreshing drink. The river was full of fish, and the forests were filled with deer and wild hogs

[60] Collected by myself from various Ifugaos of Banáuol clan, in 1906. A similar but less complete version was collected at the same place by Levi E. Case, in May, 1905, and published in *This Journal, Sec. A* (1909), 4, 256–260.

[61] Or *Alauítan* in Sub-Ifugao. See Plates I and II.

[62] The Ifugao rice drink, usually known as *búbûd*.

which were much easier to catch than those of the present day. The rice grains of that time were larger and more satisfying, and a handful of them was sufficient to feed a large family.

But this Golden Age, like others, was not destined to last.

II

The flood, and the origin of the mountains.—One year when the rainy season should have come it did not. Month after month passed by and no rain fell. The river grew smaller and smaller day by day until at last it disappeared entirely. The people began to die, and at last the old men said: "If we do not soon get water, we shall all die. Let us dig down into the grave of the river, for the river is dead and has sunk into his grave, and perhaps we may find the soul of the river and it will save us from dying." So they began to dig, and they dug for three days. On the third day the hole was very large, and suddenly they struck a great spring and the water gushed forth. It came so fast that some of them were drowned before they could get out of the pit.

Then the people were happy, for there was plenty of water; and they brought much food and made a great feast. But while they were feasting it grew dark and began to rain. The river also kept rising until at last it overflowed its bank. Then the people became frightened and they tried to stop up the spring in the river, but they could not do so. Then the old men said: "We must flee to the mountains, for the river gods are angry and we shall all be drowned." So the people fled toward the mountains and all but two of them were overtaken by the water and drowned. The two who escaped were a brother and sister named Wígan and Búgan—Wígan on Mt. Amúyao and Búgan on Kalauítan. And the water continued to rise until all the Earth World was covered excepting only the peaks of these two mountains.

The water remained on the earth for a whole season or from rice planting to rice harvest.[*] During that time Wígan and Búgan lived on fruits and nuts from the forests that covered the tops of the two mountains. Búgan had fire which at night lit up the peak of Kalauítan, and Wígan knew that there was someone else alive besides himself. He had no fire, and suffered much from the cold.

At last the waters receded from the earth and left it covered with the rugged mountains and deep valleys that exist to-day; and the solitary brother and sister, looking down from their respective peaks, were filled with wonder at the sight.

III

The repopulation of the Earth World.—As soon as the earth was dry, Wígan journeyed to Kalauítan where he found his sister Búgan, and their reunion was most joyous. They descended the mountain and wandered about until they came to the beautiful valley that is to-day the dwelling place of the Banáuol clan—and here Wígan built a house. When the house was finished, Búgan dwelt in the upper part and Wígan slept beneath.

Having provided for the comfort of his sister, Wígan started out to find if there were not other people left alive in the Earth World. He

[*] About six months. The duration of the flood varies greatly in the different versions of this myth.

traveled about all the day and returned to the house at night to sleep. He did this for three days, and then as he was coming back on the third evening he said to himself that there were no other people in the world but themselves, and if the world was to be repopulated it must be through them. * * * At last Búgan realized that she was pregnant. She burst into violent weeping, and, heaping reproaches on his head, ran blindly away toward the East, following the course of the river. After traveling a long way, and being overcome with grief and fatigue, Búgan sank down upon the bank of the river and lay there trembling and sobbing.[84] After having quieted herself somewhat, she arose and looked around her, and what was her surprise to see sitting on a rock near her an old man with a long white beard! He approached her and said: "Do not be afraid, daughter! I am Maknóñgan, and I am aware of your trouble, and I have come to tell you that it is all right!" While he was speaking, Wígan, who had followed his sister, appeared on the scene. Then Maknóñgan placed the sanction and blessing of the gods upon their marriage, assuring them that they had done right, and that through them the world must be repeopled. He told them to return to their house, and whenever they were in trouble to offer sacrifices to the gods. After Búgan had become convinced in this manner, they left Maknóñgan and returned home.

In the course of time nine children were born to Wígan and Búgan, five sons and four daughters. The four oldest sons married the four daughters, and from them are descended all of the people of the Earth World. The youngest son, who was named Igon, had no wife.[85]

IV

The sacrifice of Igon.—One year the crops failed, there was much sickness, and everything went wrong. Then Wígan remembered the advice of Maknóñgan, and he told his sons to procure an animal for the sacrifice. They caught a rat and sacrificed it, but the evil conditions were not remedied. Then they went out into the forest and captured a large snake and sacrificed it to the gods, but the disease and crop failure still continued. Then Wígan said: "The sacrifice is not great enough, for the gods do not hear! Take your brother Igon, who has no wife, and sacrifice him!" So they bound Igon, and sacrificed him, and called upon the gods. And Maknóñgan came, and all the other great gods, to the feast. And they took away the sickness, and filled the granaries with rice, and increased the chickens, the pigs, and the children. Then Maknóñgan said to the people: "It is well, but you have committed an evil in spilling human blood and have thereby brought war and fighting into the world. Now you must separate to the north, south, east, and west, and not live together any more. And when ye have need to sacrifice to the gods, do not offer rats, snakes, or your children, but take pigs and chickens only."

And one of the sons of Wígan went to the north, and one to the south, and one to the east, and one to the west; and from them are descended the peoples of the Earth World, who fight and kill one another to this day because of the sacrifice of Igon.

[84] Incest is looked upon by the Ifugaos with horror, and is held to be one of the gravest of crimes.

[85] The number and names of the children of Wígan and Búgan are variable in the different Ifugao clans.

Many other illustrations might be given of the differences between the Central and Kiáñgan Ifugao religious conceptions, but the above will suffice for the purposes of the present paper.[66]

One more type of Ifugao origin myth merits our attention before we come to the conclusion. This type consists of the myths invented to explain the origin of the ancient Chinese jars, bronze gongs, amber-agate beads, and other rare articles of foreign manufacture on which the Ifugaos place a high value, and the origin of which they do not know. Many of these objects have been in the possession of the people for at least several hundred years. They were probably brought into the Islands by Chinese traders centuries before the coming of the Spaniards, and gradually found their way to the Ifugaos through the medium of their cursory commerce with the surrounding peoples.[67]

One of these myths, explaining the origin of three well-known jars, runs as follows.

LEGEND CONCERNING BAÑGGÍLÎT OF HINAGÁÑGAN, AND THE JARS THAT HE BROUGHT FROM THE VILLAGE OF SOULS [68]

A long time ago, before the coming of the Spaniards, there lived at Hinagáñgan a man called Bañggílît. He was a wealthy man, possessing four rice granaries and a *very* large house; but he was not a priest. His constant desire was to hunt in the forest.

One day Bañggílît went hunting in the forest and was overtaken by night. He called his dogs but they did not come. He made fire, cooked, and ate. Then one dog came to him, and he took it in lead and departed. Near by he found a path. The dog with him barked and the second dog answered, and they went on. And the dog with Bañggílît began to

[66] The frequent repetition of Búgan as the name of a female deity is worthy of further explanation. Búgan is the Ifugao ideal of feminine beauty. There is no single goddess of love and beauty such as Venus or Aphrodite, but an abstract ideal of womanly perfection. Therefore, all beneficent female deities are called Búgan, which is also the most common name among Ifugao women. When a man wishes to praise his wife, he speaks of her as *Búgan-ko* (my Búgan), and when a young man goes courting he often speaks of it as *mum-Búgan* (searching for a Búgan). Light, fleecy clouds, high in the sky, are often called "the wavy hair of Búgan." Such poetic usages are almost innumerable. It is an interesting conception, and is one of the proofs of Ifugao æsthetic development.

[67] A Chinese author, Chao Ju-kua, writing in the year 1280, mentions that porcelain jars and bronze gongs were two of the most important exports from China to the Philippines.—Blair and Robertson, The Philippine Islands (1906), 34, 181–191.

[68] Free translation of an Ifugao text obtained by myself in January, 1909, from Tugínai Páit (Plate III, fig. 3), an Ifugao of Amgodé clan, Central Ifugao.

whimper and whine, and to pull on the leash; and Bañğgílît ran, and they went on. Suddenly it became light all around them, and they came out of the forest into a large group of people. And the people said among themselves: "Surely Bañğgílît is dead," and they examined his body and asked: "Where were you speared?" And Bañğgílît spoke and said: " I have not been speared! I went hunting and was overtaken by night, and my dog here ran ahead on our path. I followed, and came here, and lo! it is light here!"

And they took Bañğgílît and went to their town—for there are many large towns there in the dwelling-place of souls. They wished to give him food, but he said: "Wait until my own food is exhausted, and then I will eat of your rice here." And they asked him: "How many days will you remain with us?" and Bañğgílît answered that he would remain four days. Then the people began to laugh and one of them said: "Not four days but four *years* here!" "Ha!" cried Bañğgílît, "I shall never do that! Wait until you see!" "Just so!" answered the other, "but one day here is the same as a year on the Earth World," but Bañğgílît thought that he was lying.

Bañğgílît visited all of the towns there. He worked in the rice fields and they gave him four jars as his wages. Then his host said to him: "Return home now, for you have been here four days, which, according to the usage of the Earth World, are four years." "Yes," answered Bañğgílît, "I wish to go home now, as I am homesick for my family. You have been very good to me, for you have given me wages for my work." And the host said: "It was a gift; not wages, but a gift, that I gave you," and he led the way and pointed out to Bañğgílît a ladder. "Go down that ladder, and in a short time you will arrive at your house," he said." Bañğgílît started to go down, but one of the jars struck heavily against the ladder and was broken. He went down the ladder and at last arrived in the top of a betel-nut tree. He slid down the trunk of the tree to the ground, and the chickens were crowing and it was just dawn. And he looked at his surroundings and exclaimed: "Why this is my own house!" His relatives came out and said: "Who are you?" and he replied: "This is my house." They looked at him closely and cried: "Well now, it is Bañğgílît who has been gone these four years!" And they sat down and talked long together. He showed them the jars, and they asked: "Where did you get those?" And he answered: " I brought them from the Sky World," and they were afraid and went to look for the ladder but it was no longer there."[66]

The above myth may well have been invented by some man who, unknown to his relatives and friends, wandered across

[66] The three unbroken jars brought by Bañğgílît from the village of souls in the Sky World are still in existence and their location is as follows: The first jar is called *Inhyúwat*, and is owned by Bînwâg of Búwôt. The second is called *Ináyao*, and is owned by Ináyao of Hinagáñğan. The third is called *Búût*, and is owned by Búût of Hápao. These jars have an estimated value of several hundred pesos each, but, unless driven to it by dire extremity, their owners would not sell them for any price. (Plate IV, fig. 1.)

the mountains into Lepanto or Benguet and returned after four years with the jars in question. Hundreds of myths and legends of this type are current among the Ifugaos.

No representative collection of Philippine myths has yet been made, and the present paper can only be considered a beginning. I hope to be able to continue the work.

ILLUSTRATIONS

PLATE I

Sketch map of the subprovince of Ifugao, showing its location, boundaries, and division into culture areas.

PLATE II

FIG. 1. Mount Amúyao, the first of the two sacred mountains of the Ifugaos: elevation, 9,270 feet (2,826 meters). (Photograph by Martin.)

2. Mount Kalauítan, the second of the two sacred mountains of the Ifugaos; elevation 7,000 feet (2,134 meters). (Photograph by Miller.)

PLATE III

FIG. 1. An Ifugao priest. (Photograph by Beyer, Banaue, 1907.)

2. Ifugao mother and babe—showing the manner in which Búgan carried Balitúk. (Photograph by Martin, Kiáñgan, 1904.)

3. Tugínai Páit, of Amgodé clan, and his wife. (Photograph by Beyer.)

PLATE IV

FIG. 1. Scene at a Kiáñgan celebration. Note the Chinese jars in the foreground. Those that Bañggílît brought from the village of souls, in the Sky World, are of the type of the third jar from the left. (Photograph by Tomlinson.)

2. View from Ifugao toward the mythical region of the East. In the foreground are the Ifugao rice terraces—the most distinguishing feature of their culture. (Photograph by Beyer.)

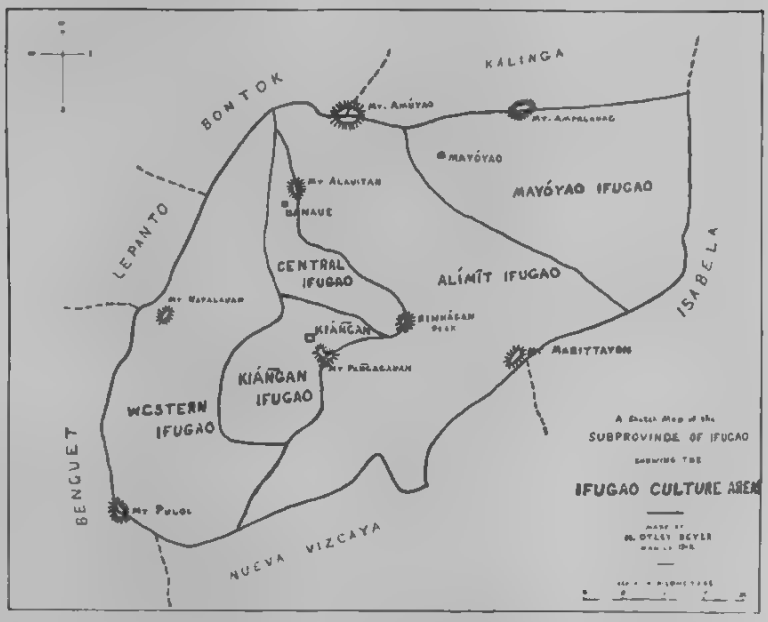


PLATE 1. SKETCH MAP OF THE SUBPROVINCE OF IFUGAO.

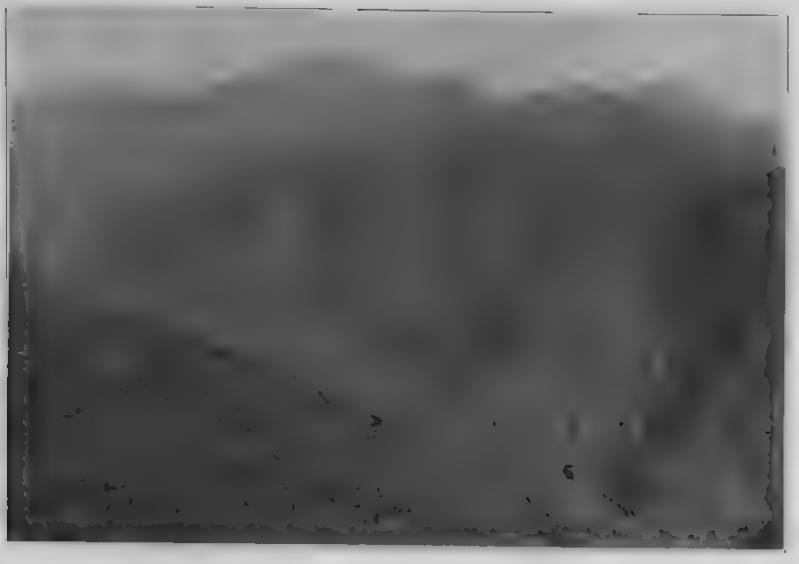


Fig. 1. Mount Amúyao, the first of the two sacred mountains of the Ifugaos.

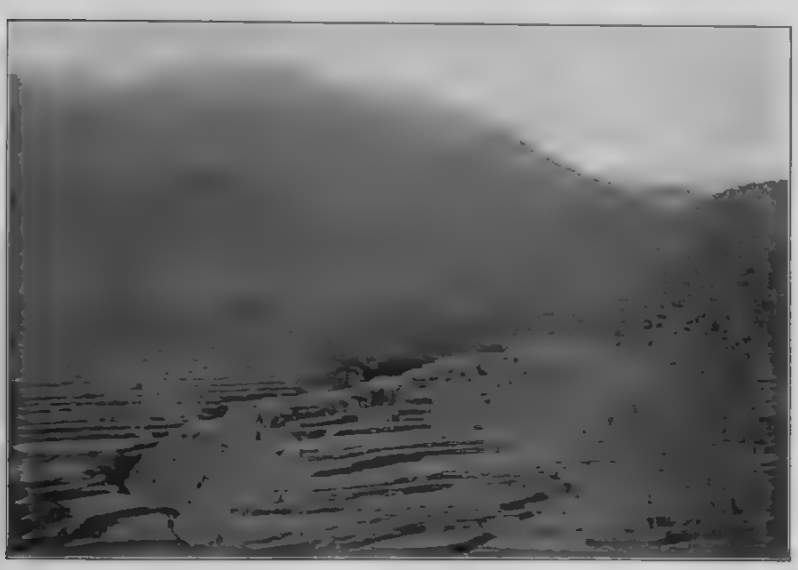


Fig. 2. Mount Kalauitan, the second of the two sacred mountains of the Ifugaos.

PLATE II.

Fig. 1. An Ifugao priest.

Fig. 2. Ifugao mother and babe.

Fig. 3. Tuginal Pálit and his wife.

PLATE III.

Fig. 1. Scene at a Kiáñgan celebration.

Fig. 2. View from Ifugao toward the mythical regions of the east.

PLATE IV.

THE HABITS OF SOME TROPICAL CRUSTACEA

By R. P. Cowles

(From the Zoölogical Laboratory, University of the Philippines, Manila, P. I.)

One plate and 3 text figures

On the northern shore of the Island of Mindoro in the Philippine Islands lies the almost land-locked bay of Port Galera, long famous for its beautiful "sea-gardens" and for the fact that it affords perfect safety for ships during typhoon weather. On the shores of this bay the University of the Philippines and the Bureau of Science established a temporary marine biological station which was in session during the months of March, April, May, and June of the year 1912. Here during this period I observed the habits of two well-known, peculiar marine crustacea. The results of these observations are given below.

SPONGE CARRYING OF CRYPTODROMIA

Among the many remarkable animals which may be found in Port Galera Bay are the brachyuran crustaceans belonging to the family Dromiidæ. The crabs of this family are of special interest because of their supposed primitive characters and because of the fact that some of the species carry pieces of foreign matter over their backs. These covers are usually held loosely by means of the dorsally placed fifth pair of legs, but in some cases they become firmly attached to the carapace.

Cryptodromia tuberculata Stimpson, the most abundantly represented species of the Dromiidæ in Port Galera Bay, lives on the underside of rocks in about the middle of the littoral zone, but it is easily overlooked because it is usually covered dorsally by a little piece of grayish sponge which it carries in the characteristic manner of the family. The protection afforded by this cover is further increased by the fact that there are as a rule other pieces of similar shape and size and even larger sheets of the same gray sponge, 4 or 5 millimeters thick and from 300 to 400 square centimeters in area, found living independently of the crab and adhering to the underside of the rock.

It is a surprise to the collector when, on turning over a rock covered with large and small patches of the gray sponge, he sees

some of the smaller patches suddenly become animated and crawl away. Another surprise is in store for him when he picks up one of these small patches and finds it to be the cover of a crab carefully hollowed out so as to fit the outline of the carapace, and lightly held in place by the last pair of legs whose dactyli are hooked into the inturned rim (fig. 1).

Zoölogists are familiar with the fact that *Cryptodromia tuberculata* generally carries a cover of some sort, usually a sponge, occasionally a piece of ascidian, or even rarely a leaf, but so far as I have been able to determine from the literature at hand the activities of the crab while obtaining its covering have not been described. The occurrence of large areas of the sponge encrusting the underside of the rock which sheltered the cryptodromia suggested the possibility of bringing the rock

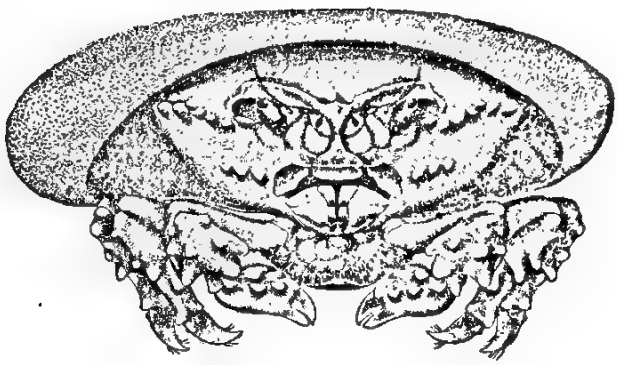


FIG. 1. *Cryptodromia tuberculata* Stimpson and its cover.

with the crabs and sheets of sponge intact into the laboratory and there observing the behavior in an aquarium. This was done, and at the same time the crabs were deprived of their covers. After being left undisturbed for about half an hour, it was found that several individuals had decorated themselves with new pieces of sponge which though irregular in outline were used as covers and held over the carapace by means of the last pair of legs.

In order to observe the details of the process of obtaining these new covers, a rock encrusted with a sheet of sponge was placed in a large glass dish of sea water so that the sheet of sponge was on the upper side of the rock. A naked cryptodromia which was placed in the middle of the patch of sponge soon moved toward the periphery. Here it settled down with the abdomen near the edge and the head facing the area of sponge. Then with the chelipeds it began to excavate a groove destined to cut

off a small piece from the sheet of sponge. After the piece had been isolated, the crab lifted the edge, pushed itself under, and finally dislodged the piece from the rock. The cryptodromia then caught hold of this new but ragged cover by means of its last pair of legs and carried it off. Four stages in this process are shown on Plate I. In the upper left hand corner of fig. 1 the crab is seen rather indistinctly cutting out the piece, in a similar region of fig. 2 the cutting is completed, in fig. 3 the crab has pushed its way under the newly separated piece of sponge, and finally in fig. 4 the piece is being carried off. All of the figures are of further interest in that they show at the right hand edge a little below the middle another cryptodromia whose original cover has not been tampered with. In addition to the sheet of gray sponge which may be seen in all the figures, there are also many patches of an ascidian (light in color both in nature and in the figure) which are sometimes used for covers.

The method of obtaining covers which I have described is undoubtedly the same as the one used by *Cryptodromia tuberculata* when living under natural conditions, for I have found individuals under rocks with similar unfinished covers which undoubtedly had been recently cut from sheets of the sponge. It is of interest to know that the new ragged covers cut out by the crabs in the laboratory began to assume a more regular appearance after a few days and to take on the shape of the covers found on the cryptodromia when living in the sea.

TUBE BUILDING OF ALPHEUS PACHYCHIRUS

It is well known by zoölogists that one of the "pistol crabs," *Alpheus pachychirus* Stimpson, lives in a tube which it constructs of the matted thread of a filamentous alga. Richters (1880)[1] and de Man (1888)[2] published this information, but Coutière (1899)[3] has not found the same species living in alga-tubes at Djibouti. So far as I have been able to ascertain without having access to the paper of de Man, the behavior of this crustacean while constructing the alga-tube has not been described, so the following notes may be of interest.

On the underside of the rocks in the littoral zone of Port Galera Bay there may be found the sac-like alga-tubes of *Alpheus*

[1] Beiträge zur Meeresfauna der Insel Mauritius und der Seychellen. Berlin (1880), 164.

[2] *Arch. f. Naturg.* (1888), 5.

[3] Thèses présentées à la Faculté des Sciences de Paris: Les "Alpheidae," morphologie externe et interne, formes larvaires, bionomie. Paris (1899), 500.

pachychirus. These tubes are often 25 to 30 centimeters long and 2 centimeters or more in diameter, but they may be much smaller than this. One end is usually wider than the other (fig. 2), and is firmly attached to the rock while the rest of the tube is fastened only at intervals. Several branches with openings may be present, the number varying in different tubes. A microscopic examination shows that the tubes are nothing more than a dense mat of filamentous algæ so well worked together as to resemble a piece of loosely woven cloth.[4]

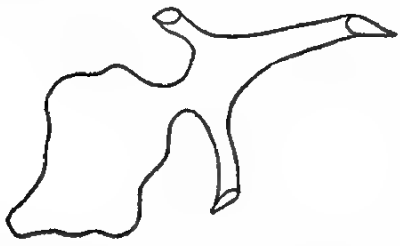


FIG. 2. Alga-tube of *Alpheus pachychirus* Stimpson. Outline sketch showing branches and openings.

Whether the alga-tube is used by the alpheus as a shelter throughout its life or whether it is only used during the breeding season, I am unable to decide. Coutière (1899) found *Alpheus pachychirus* at Djibouti without the alga-tube, but he attributed this to the scarcity of algæ. Professor L. E. Griffin in February, 1912, found about half-a-dozen tubes at Port Galera, and in each case there were two individuals, supposedly male and female, but neither was carrying eggs. During March, April, and May, 1912, I collected 10 or 12 tubes from the same locality and found with one exception a male and female in every tube. In this exceptional case there was only a female present, and she was ovigerous.

In order to see the method of tube-making, the following simple experiments were undertaken. An alga-tube containing a male and female alpheus was removed from a rock and slit open from end to end, after which it was laid out as flat as possible in the bottom of a dish of sea water. The two crustacea were then placed on the piece of matted alga where they remained for some time, inactive, so far as construction was concerned. Finally the male took advantage of a slight furrow in which it was lying lengthwise, turned itself on its back, and using the slender pair of chelate legs immediately back of the chelipeds reached up and drew the sides of the furrow close together. Then in the following manner it began to sew together the two

[4] In the opinion of Dr. Marshall A. Howe, of the New York Botanical Garden, this alga belongs to the Cyanophyceæ and is a species of *Plectonema* closely allied to, and perhaps identical with, *P. wollei* Farlow. The latter is a fresh-water form, however, while the former is marine.

edges of the mat thus apposed (fig. 3). The slender chelate leg of one side was thrust through the edge of the mat of the corresponding side and then bent over until the open chela was able to take hold of a thread of alga near the edge of the opposite side. The leg was then drawn back, pulling with it the thread which, however, still remained entangled in the opposite side, thus making a simple stitch. At the same time that the operation just described was taking place, a similar one was performed by the other slender chelate leg, the result being that from each side a thread was drawn out part way and pulled through the opposite side. In this manner the edges of the furrow were gradually fastened and a tube formed. The alpheus did not sew up the tube from one end to the other without a break, but stitched it together at intervals first and later closed up the spaces between. The movement of the slender chelate legs was very rapid so that after ten minutes a tube about 10

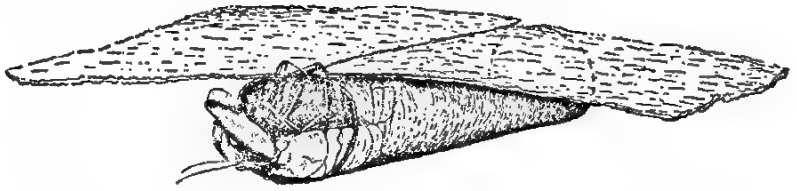


FIG. 3. A diagrammatic view of *Alpheus pachychirus* Stimpson sewing the edges of an alga-mat together.

centimeters long had been formed. At the end of this time, as the result of some signal from the male or simply by chance, the female, which had been resting quietly several centimeters away, backed into the new tube with the male.

Having seen the method of making a tube out of a continuous sheet of alga, I was anxious to determine if the alpheus could construct a new tube out of the fragments of an old one. A tube was opened and torn into such minute shreds that a large number of single filaments separated out. A pair of alpheus was placed in a dish of sea water where they soon retreated under a more or less flat stone so arranged that there was a space below it. The mass of individual filaments and small fragments of the alga were then placed in the dish. After about five minutes, one of the crustaceans began to draw the alga under the stone, and fifteen minutes later, on siphoning the water out of the dish in order to add more water, it was found that the filaments and the fragments had been so securely attached in several places to the underside of the rock that they remained

hanging after the water had been removed. On several occasions after refilling the dish the alpheus was seen pushing filaments upward in the attempt to attach them to the rock under which they were building the tube. They were successful in this, every now and then the filaments becoming caught on the sharp edges of the coral rock or entangled in some other kind of alga growing on the rock. After a time the mass of alga which had been drawn under the rock began to take on the shape of a tube as a result of the activity of the slender pair of chelate legs. These legs worked quickly, first here and then there, drawing free edges together and stitching them. When the alpheus found a hole in the rapidly forming tube, the slender legs came through, caught hold of the filaments of the alga, and manipulated them in much the same manner as a man might the thread with which he darns a hole in his sock; that is, by drawing the edges of the hole together and fastening them.

The next morning a fairly well-made tube was present in which the outer surface was uniform, the shreds having been worked into an even surface. The cavity was distinct, and the inner walls smooth. This new tube measured 11.5 centimeters in length, about 2.5 centimeters in width, had one opening to the exterior, and harbored the pair of alpheus.

ILLUSTRATIONS

PLATE I

FIG. 1. In upper left hand corner, a crab cutting out a piece of sponge.
2. The cutting completed.
3. The crab has pushed its way under the newly separated piece of sponge.
4. The piece is being carried away.

TEXT FIGURES

FIG. 1. *Cryptodromia tuberculata* Stimpson and its cover.
2. Alga-tube of *Alpheus pachychirus* Stimpson. Outline sketch showing branches and openings.
3. A diagrammatic view of *Alpheus pachychirus* Stimpson sewing the edges of an alga-mat together.

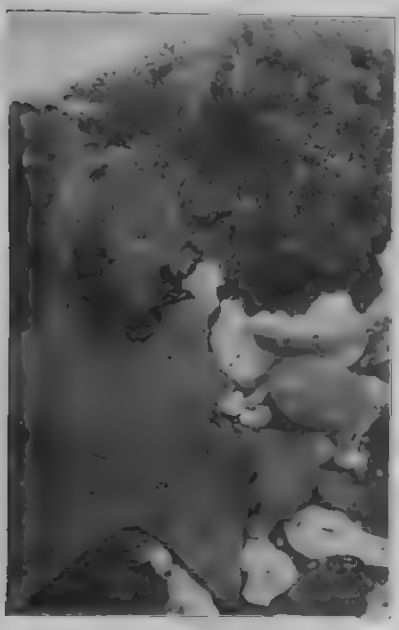


Fig. 1.

Fig. 2.

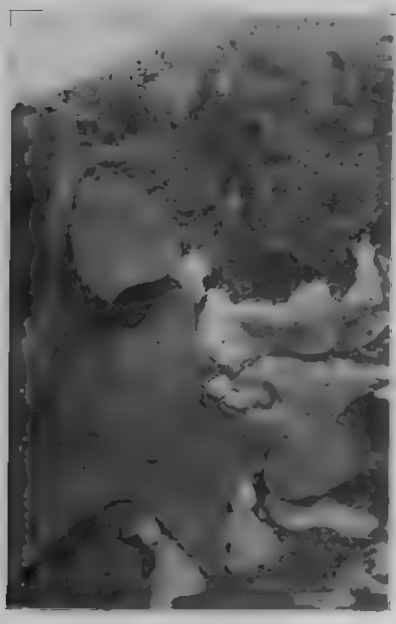


Fig. 3.

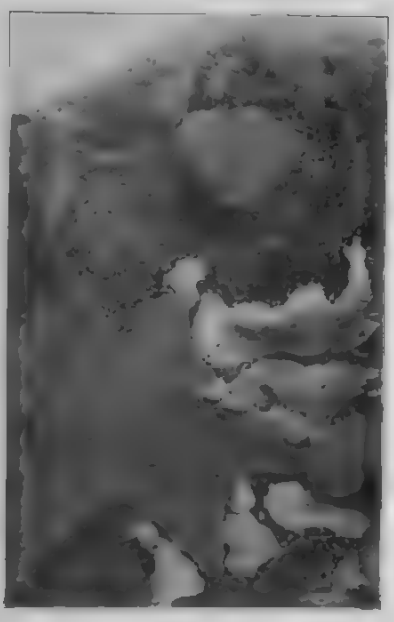


Fig. 4.

Cryptodromia tuberculata Stimpson making a cover. See text.

PLATE I.

THE COCONUT LEAF-MINER BEETLE, PROMECOTHECA CUMINGII BALY

By CHARLES R. JONES

(From the Bureaus of Science and Agriculture, Manila, P. I.)

Two plates

The coconut tree (*Cocos nucifera* L.) is attacked by a comparatively small number of insects, but the damage due to the ravages of these insects is rather large as compared with the injury of insects to some of the other crops of these Islands. This palm has several insect enemies that feed extensively upon the trunk and leaves, and in seasons favorable to insect development these entail a considerable loss upon the grower.

Banks [1] divides coconut insects into two classes—those that attack the trunk and those that damage the leaves. Barrett [2] discusses the insect enemies of the coconut. Froggott [3] deals extensively with the pests and diseases of the coconut palm. However, none of these papers record *Promecotheca cumingii* Baly, which in both the adult and larval stages feeds upon the leaves of the young coconut. I have made several observations on old bearing coconut palms, but have not found them infested by this pest. In all probability they are little affected by this insect.

This beetle belongs to the subfamily Hispinæ of the family Chrysomelidæ, which contains our worst leaf-eating beetles. Members of this subfamily are distributed generally throughout these Islands. There is little doubt that this species, or representatives of this subfamily, occur in all coconut-growing countries. Froggott [4] reports a species of this subfamily as being the most serious coconut pest of the Solomon Islands. The object of the present paper is to give an account of the habits and life history of the coconut leaf-miner beetle with methods for its control.

[1] *This Journal* (1906), 1, 143–169, 11 pls.; *ibid.*, 211–228, 10 pls.
[2] *Phil. Agr. Rev.* (1912), 5, 254, 3 pls.
[3] *Sci. Bull., N. S. W. Dept. Agr.* (1912), No. 2, 1–47; 7 pls., 10 figs.
[4] *Ibid.*, 24, 26.

LIFE HISTORY

Egg.—The eggs (Plate I, fig. 1) of *Promecotheca cumingii* are deposited singly on the underside of the leaflets and generally on the lower leaves of young palms. The beetle eats a small hole through the lower epidermis of the leaf, leaving the edges of the hole very rough. The egg is inserted in this hole, and cemented in place with a yellowish glutinous secretion which turns dark brown upon hardening, and resembles dried leaf-tissue. During this process the abdomen of the insect is moved with a rotary motion. After resting over the egg for a few seconds, the beetle moves away and begins feeding again. In several cases after the egg had been cemented in place, the adult was observed to pat it with her front feet.

The eggs are flat, semielliptical, brownish bodies shaped somewhat like a pumpkin seed. The outer surface or covering is very rough, and the eggs are very easily broken when this protective substance is removed. They are about 1.5 millimeters in length; 1 millimeter in width; and 0.3 millimeter in thickness. The period of incubation of 286 eggs averaged 13.5 days, of which the maximum was fifteen and the minimum thirteen days.

Larva.—Upon hatching, the larva (Plate I, figs. 2 and 3) eats its way through the egg wall and directly into the tissue of the leaflet where it spends its entire larval and pupal stages and is somewhat protected by the lower and upper epidermis of the leaflet. The larvæ are fleshy footless grubs, and average about 1.2 millimeters in length when newly hatched. The head is the largest segment; it is a translucent, shiny brown, and wedge-shaped with rounded sides. The mandibles are black, and can be drawn under the labrum. Two brownish lines form an X on the back of the head. Two whitish lines extending under the head-cast near the apex give it the appearance of an arrowhead. These markings are absent in later stages. In the older larvæ the head is slightly smaller than the following segment; the body is cream colored and semicylindrical, tapering from segment 1 to segment 11; the anal segment is about one-half the size of segment 1. Segment 1 is depressed anteriorly. Segments 1 to 11 are protruded into tubercles on both sides which give rise to setæ of 6 hairs each.

The average length of the full-grown larva is 9.54 millimeters, and the average width of the head cast is 1.54 millimeters. The average time required in the larval stage is thirty-two days; twenty-eight of these are spent in feeding and developing, and four days without feeding, during which time the larva changes

into a pupa. During development, the larva feeds upon the parenchyma of the coconut leaf, and, except when molting, it can be found at the extremity of the chamber opposite the egg. The larva eats in one direction, leaving the old eggshell at the starting point. When molting and when changing into a pupa, it recedes to the center of its chamber. A characteristic habit of the larva is the deposition of its excrement in two rows (Plate I, fig. 13), one on each side of the excavated chamber.

In studying the insect, adults were placed in gauze bags which were tied over the leaflets of the palm. The insects were removed daily to fresh leaves, and the leaflets containing the eggs were tagged, but still kept in the gauze sacks to exclude possible parasites. Daily observations were made on the eggs for hatching, and the larvæ were examined every two days for molts.

After the larval chamber had been opened, the leaf curled and dried and the larva soon died; therefore, it was necessary to take 4 larvæ of the same age each day for observation. In no case were more than two molts observed. The exact number of molts has not been definitely established, owing to the difficulties of observing the insect.

Pupa.—After the larva is full-grown it retires, as stated above, to the center of the chamber, where without forming any pupal cell it changes into pupa and adult. The average time occupied in the pupal stage is 7.3 days, of which the maximum was twelve and the minimum five days. The pupa (Plate I, figs. 4 and 5) is orange chrome or burnt sienna, and is covered with hairs; the head is smaller than the thorax, the eyes are black, the mandibles are brown, and the anterior tarsi are in a vertical position opposite each other as shown in Plate I, fig. 4. There are 2 rows of transverse black spines on each segment, the anterior of which consists of 6 spines. The pupæ average about 1.62 millimeters in width and 8.11 millimeters in length.

Adult.—The beetles (Plate I, fig. 6) vary from 7.5 to 10 millimeters in length, and are from 1.6 to 2 millimeters in width. The thorax is much narrower than the slender abdomen. The general color is brown ocher, the head is small, the eyes and mandibles are black, and the elytra are finely punctate in parallel furrows. The antennæ are 11-jointed. The tarsi are broad and flat. There is 1 spine on the inner side of each femur with a corresponding depression on the tibia. The body is pilose.

The beetles are sluggish and do not fly readily upon being disturbed. They rest by clinging slightly to the underside of the leaf, antennæ extended forward flat against the leaf. They crawl about promiscuously on the leaves of young coconuts, and

feed extensively upon the tissues between the veins of the leaflets. The injury has the appearance of a slight cut, but does not entirely penetrate the leaf (Plate II, fig. 1).

The injury done by the larva is greater than that of the adult, as a single larva will excavate a place in the leaf from 12 to 16 millimeters long and 1.5 to 3 millimeters wide (Plate II, fig. 2). The tissue affected soon dies and becomes brown, and in badly infested areas the trees soon have the appearance of unhealthy and half-dead palms. Where the palms are used for ornamental purposes, the effect is very displeasing. The palm itself is injured by the loss of these leaflets.

Control.—The palm leaf-miner undoubtedly has many enemies, both predacious and parasitic. Two species of hymenopterous parasites of the family Chalcidæ have been bred in great numbers, one from the egg (Plate I, fig. 9) and one from the larva and pupa (Plate I, figs. 7 and 8). These have not yet been identified. It is probable that these parasites keep this beetle in check, and were it not for them the leaf-miner would be a most serious pest to the coconut industry. Observations have shown that a little over 44 per cent of the larvæ and pupæ, and an average of about 5 per cent of the eggs are parasitized by chalcids. From these two parasites alone, the total percentage of mortality is at least 50, and probably very much greater.

The following table gives the results of the examination of 100 leaflets taken from infested palms:

TABLE I.—*Eggs, larvæ, and pupæ of Promecothera cumingii Baly taken from 100 leaflets of the coconut palm, August 3, 1910.*

Leaflets examined.	Eggs.	Larvæ and pupæ.	
		Alive.	Dead.
10	23	20	18
10	41	30	11
10	33	23	23
10	25	29	22
10	27	33	35
10	29	21	16
10	30	17	12
10	21	15	6
10	24	15	11
10	13	14	22
100	271	217	176

REMARKS.—Leaves taken at random from different palms. No account was kept of previous infected places, the only record was of places that contained stages of the leaf-miner. Percentage of larva parasitized, 44.7. Three leaves were found free from infestation.

As the eggs, larvæ, and pupæ of the leaf-miner are protected to a greater or lesser extent within the leaf tissue, hydrocyanic-acid gas is the only insecticide that could be used effectively. This method is only to be recommended in extreme cases, where infestation is very heavy. As the beetles are not very active and are almost invariably on the lower leaves of the young coconut palms, they can be readily gathered. The infested leaflets are readily recognized, and can be removed easily and burned, thus destroying the eggs, larvæ, and pupæ.

The adults can be removed by hand. Child labor may be employed, and if this method is practiced in the infested young coconut groves it will be an inexpensive and effective way of coping with the situation.

ILLUSTRATIONS

(Drawings by J. A. Dimayuga: photographs by M. del Castillo)

PLATE I

FIG. 1. Egg, 3 diameters.
2. Larva, dorsal view, 1½ diameters.
3. Larva, lateral view, 1½ diameters.
4. Pupa, ventral view, 1½ diameters.
5. Pupa, lateral view, 1½ diameters.
6. Adult, dorsal view, 1½ diameters.
7. Larva attacked by parasites, 17 diameters.
8. Larva attacked by parasites, 17 diameters.
9. Egg attacked by parasites, 17 diameters.
10. Egg, 30 diameters.
11. Coconut leaflets, showing injury by larva of coconut leaf-miner.
    a. Old larval cell.
    b. Newly hatched larvæ.
12. Coconut leaflets, showing injury by larvæ and adults.
    a. Larval injury.
    b. Adult injury by feeding.
    c. Hole where adult escaped.
13. Coconut leaflet, showing feeding larva and excrement placed along sides of chamber.

PLATE II

FIG. 1. Coconut leaflets, showing injury caused by the adults.
2. Coconut leaflets, showing injury caused by the larvæ.
    a. Hole where adult escaped.

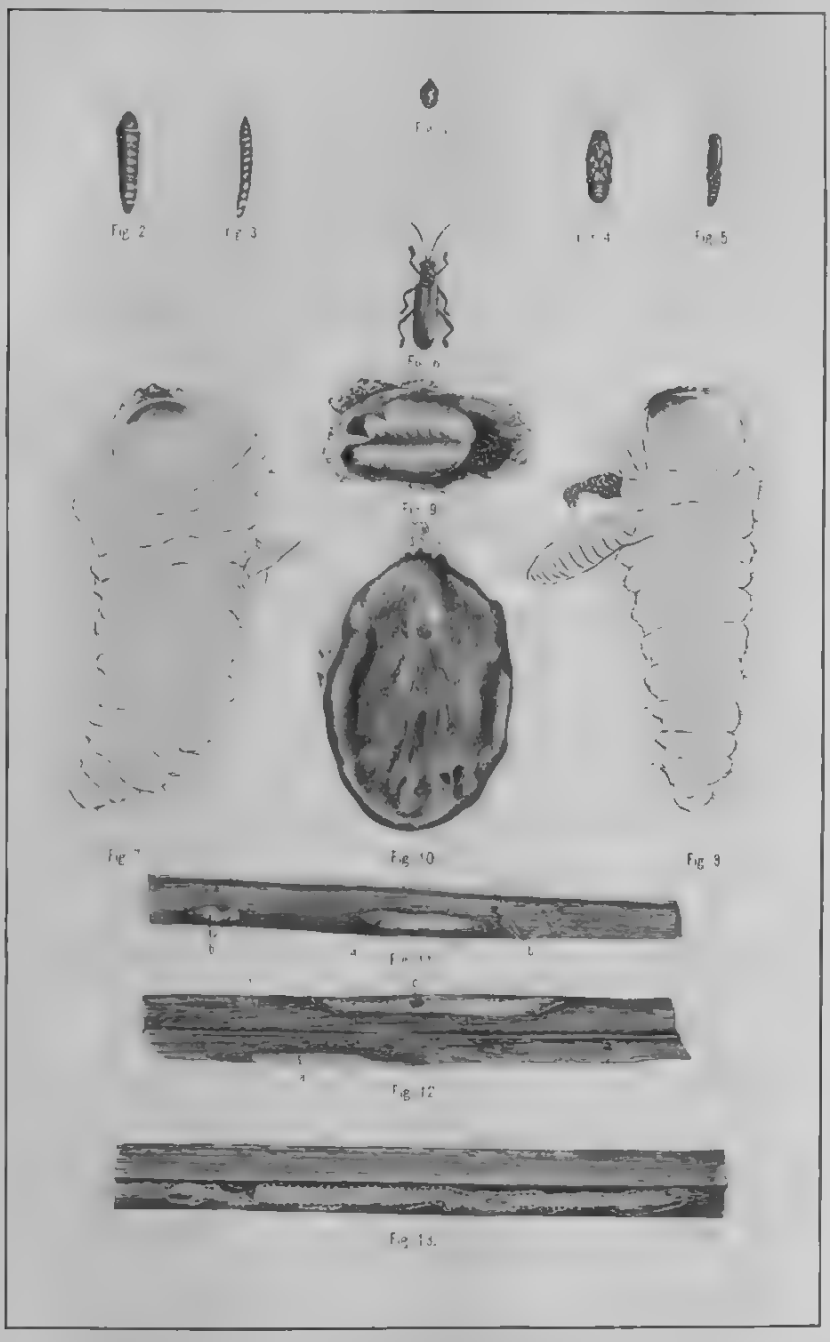


PLATE I. STAGES OF PROMECOTHECA CUMINGII BALY.

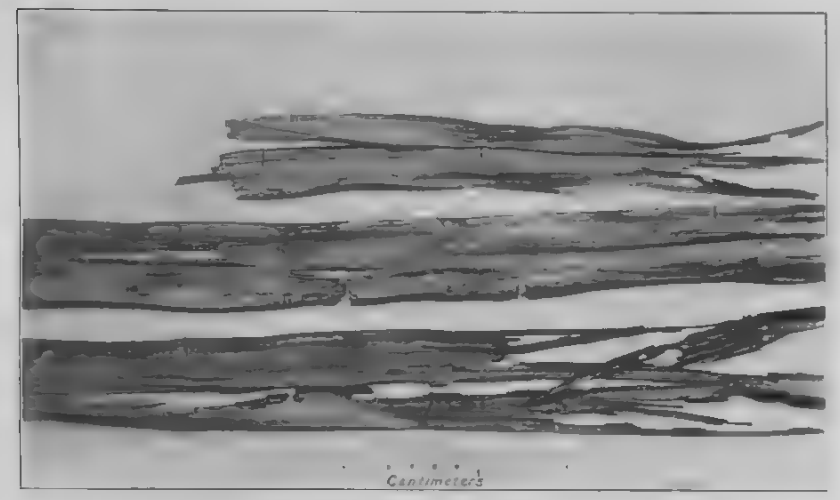


Fig. 1. Coconut leaflets, showing injury caused by the adults.

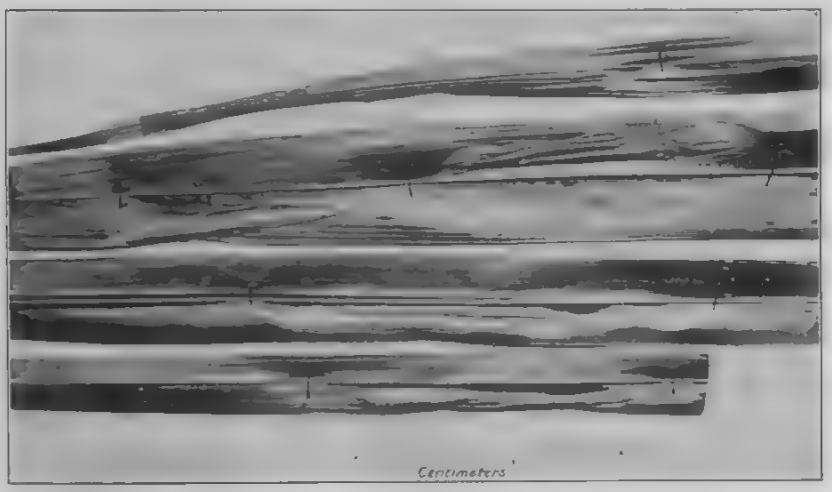


Fig. 2. Coconut leaflets, showing injury caused by the larvæ.

PLATE II.

NEUE KÄFER VON DEN PHILIPPINEN

Von K. M. Heller

(Kgl. Zoologisches und Anthropologisch-Ethnographisches Museum, Dresden, Germany)

Mit 14 Figuren im Text

In diesem Beitrag zur Coleopteren Fauna der Philippinen werden folgende neue Arten und Varietäten, deren Kenntnis ich zum weitaus grössten Teil einer Sendung des Bureau of Science in Manila verdanke, beschrieben:

Curculionidæ

1. *Cepurellus cervinus* sp. nov.
2. *Ergania decorata* sp. nov.
3. *Ergania decorata* var. *zamboangana* nov.
4. *Nanoplaxes* (gen. nov.) *merrilli* sp. nov.

4a. *Nanoplaxes ferruginea* sp. nov. (ex India orientalis!).

5. *Cyamobolus* (?) *palawanicus* sp. nov.
6. *Asytesta philippinica* sp. nov.
7. *Sclerolips ochrodiscus* sp. nov.
8. *Endymia philippinica* sp. nov.
9. *Metialma obsoleta* sp. nov.
10. *Nauphaeus sexmaculatus* sp. nov.
11. *Cercidocerus flavopictus* sp. nov.
12. *Ommatolampus hæmorrhoidalis* var. *pygidialis* nov.
13. *Eutornus luzonicus* sp. nov.
14. *Eutornus stricticollis* sp. nov.
15. *Eutornus rufobasalis* sp. nov.

Brenthidæ

16. *Amphicordus* (gen. nov.) *inproportionatus* sp. nov.
17. *Henarrhodes* (gen. nov.) *macgregori* sp. nov.

Cerambycidæ

18. *Ocalemia prasina* sp. nov.
19. *Euryphagus maxillosus* var. *nigricollis* nov.
20. *Planodes schultzei* sp. nov.
21. *Agelasta mediofasciata* sp. nov.
22. *Euclea rhombifera* sp. nov.

Erotylidæ

23. *Encaustes palawanica* sp. nov.
24. *Encaustes tagala* sp. nov.
25. *Triplatoma exornata* sp. nov.

1. Cepurellus cervinus sp. nov.

Oblongo-ovalis, supra omnino unicolor dilute cervinus, subter albido-squamosus; rostro latitudine triplo longiore, dorso in medio et in lateribus carinulato, spatiis crebre punctatis ac setulis, transverse directis, obsitis; antennis fuscescentibus, scapo curvato, oculum attingente, funiculo septem articulato, articulo secundo primo distincte longiore, reliquis brevibus subquadratis, clava elongata (articulis 6 praecedentibus aequilonga), prothorace trapezoidali, longitudine fere duplo latiore; scutello punctiforme, nigro; elytris sat subtiliter striato-punctatis, spatio nono in quarto basali dilatato; corpore subter subrosaceo-albido-squamoso, mesosterno tuberculato, tarsis articulo secundo transverso-trapezoidali.

Long. 8.5, lat. 5. mm.

Hab. MINDANAO, Zamboanga, Port Banga, legit *W. J. Hutchinson* (Bur. Sci. Acc. No. 8692).

Länglich oval, oberseits gleichmässig hell rehbraun beschuppt. Rüssel dreimal so lang wie breit, in der Mitte und an den Seiten geleistet, dicht punktiert und spärlich mit quergestellten Börstchen besetzt. Stirn zwischen den Augen nur so breit wie die Fühlergeissel dick ist, oval; Fühler bräunlich, Schaft das Auge erreichend, gebogen, an der Spitze stark verdickt, zweites Geisselglied so lang wie die drei folgenden, ziemlich kugeligen zusammen, Keule fast so lange wie die ganze Geissel, ihr erstes Glied konisch, zwei Drittel der Keulenlänge einnehmend. Halsschild quer, die Seiten kaum merklich, der Hinterrand deutlich gerundet, der Vorderrand schwach ausgerandet, die ziemlich rechtwinkeligen Hinterecken am äussersten Rande weiss beschuppt. Schildchen klein, punktförmig. Flügeldecken ziemlich fein gereiht-punktiert, jeder Punkt auf dem Grunde mit sehr kleinem Börstchen, die Streifen, vom sechsten ab, vorn abgekürzt, das vorletzte Spatium im Basalviertel erweitert. Unterseite dicht weisslich, an den Seiten der Hinterbrust etwas rosa schimmernd beschuppt. Mesosternum zwischen den Mittelhüften nach vorn zu höckerartig vorgewölbt.

Der relativ lange Rüssel, sowie das zweite quer trapezoidale Tarsenglied, veranlassen mich diese Art in die von mir in der

Entomologischen Zeitung, Stettin (1908), 137, errichteten Gattung zu stellen. Da die Augen der hier beschriebenen Art wie bei *Cepurus* breit oval sind, so scheidet ihre Form als Gattungsmerkmal aus.

2. **Ergania decorata sp. nov.**

Nigra, sat dense ochraceo-squamosa; rostro crebre punctato, carinula mediana tenui, basi subquinque-carinulata; prothorace crebre punctato, squamulis in vittis tribus, una mediana et duabus lateralibus, contensatis; elytris striato-punctatis, scutello vittaque suturali in primo triente, macula oblonga, rectangulari, humerali fasciaque postmediana albido-squamosis.

Long. 11, lat. 6.2 mm.

Hab. LUZON, Los Baños, legit *E. M. Ledyard* (Bur. Sci. Acc. No. 13400).

So robust wie *E. proxima* Faust [Ann. Mus. Civ. Genova (1894), 238], ziemlich dicht lehmgelb beschuppt, drei Linien auf dem Halsschild, die Nahtwurzel, eine Schultermakel und eine Querbinde hinter der Deckenmitte weisslich. Rüssel dicht punktiert, mit feiner Mittelleiste, im Basalteil mit spärlichen Schüppchen und jederseits mit zwei undeutlichen Längsleistchen. Erstes und zweites Geisselglied der Fühler verlängert, die folgenden Glieder leicht quer und gelblich, die letzten zwei dunkler beborstet, die Keule schwarz. Halsschild dicht punktiert, jeder Punkt mit einem Borstenschüppchen, das mit seiner Spitze nach vorn gerichtet ist, in der Mittellinie und innerhalb des Seitenrandes sind die Schüppchen zu hellen Längsstreifen verdichtet. Schildchen fast quadratisch, hinten wenig breiter als vorn, gewölbt, weiss tomentiert. Flügeldecken stark gewölbt, gestreift-punktiert, die Punkte klein, aber tief eingestochen, 4. und 5., 6. und 7. Streifen je an der Spitze mit einander verbunden. Das erste Drittel der Naht, eine längliche Makel an der Wurzel zwischen dem 4. und 6. Streifen, eine Querbinde hinter der Mitte, die vom 2.–10. Streifen reicht und auf dem 4. und 8. Spatium nach vorn ausgezogen ist, weiss. Unterseite gelblich weiss beschuppt, ein Längsstreifen auf der Vorderbrust über den Vorderhüften sowie der Aussenrand der Hinterbrust rein weiss.

3. **Ergania decorata var. zamboangana nov.**

Praecedenti simillima, sed tomento principali nigro, loco ochraceo, maculis aequaliter dispositis sed macula vittiforme ad apicem in spatio tertio amplius.

Long. 11.1, lat. 6.2 mm.

Hab. MINDANAO, Zamboanga, legit *T. C. Zchokke* (Bur. Sci. Acc. No. 13614).

Genau sowie die vorhergehende Art, nur die Grundfarbe der Beschuppung schwarz und vor der Deckenspitze, auf dem 3. Spatium mit einer überzähligen weissen Längsmakel.

NANOPLAXES genus novum

Trypetidarum [1]

Corpus depressum. Rostrum filiforme. Antennae geniculatae, funiculo quinque-articulato. Caput transversum, oculi convexi. Prothorax transversus, lateribus rotundatis, basi truncata. Scutellum distinctum. Elytra oblonga, novem-striatis, pygidium obtegentia. Coxae omnes distantes, intermediae et posticae anticis remotiores. Mesosternum fere rectangulare, transversum, prosterno adpressum. Segmentum abdominale secundum duobus sequentibus aequilongum. Femora breves, clavata, inermes. Tibiae anticae apice uncinatae. Tarsi crypto-pentameri, articulo tertio bilobo.

Diese neue Gattung, die neben die Gattung *Plaxes* Pasc. [Ann. Mus. Civ. Genova (1885), 296] zu stellen ist, unterscheidet sich von ihr durch die schmälere Körperform, den an der Wurzel gerade abgestutzten Halsschild, die das Pygidium bedeckenden Flügeldecken und von allen Trypetiden durch die nur fünfgliederige Fühlergeissel.

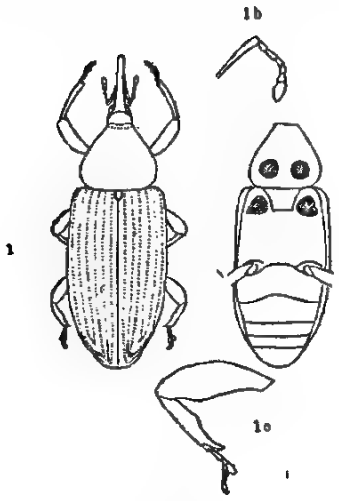


FIG. 1.

4. Nanoplaxes merrilli sp. nov. (figs. 1, 1a, 1b, 1c).

Rufus, elytris nigris, depressus; rostro prothorace aequilongo, lateribus ut fronte punctato, hic inter oculos foveola; prothorace transverso, maxima latitudine basin propiore, disco leviusculo, margines versus punctulato; scutello distincto, rufes-

[1] It is doubtful if Trypetidæ can stand as a family of the Coleoptera, based as it is on *Trypetes* described by Schönherr in 1836 (Gen. et Spp. Curc., 595), since the same term is used in Diptera, based on *Trypeta* described by Meigen in 1826 (Syst. Beschr. 5). C. S. BANKS.

centi, latitudine paulo longiore; elytris margine apicali subexplanato, punctato-striatis, spatiis 6., 7., et 8. basi abbreviatis, spatiis dorsalibus planatis, apicem versus subcostulatis; corpore subter parce, impressione ovali communi in segmentibus abdominalibus duabus anticis, ut segmento ultimo, densius punctatis ac parce flavo pilosis.

Long. tot. (usque ad rostri apicem) 6–6.5, lat. 2 mm.

Hab. LUZON, Bataan, Lamao, legit *E. D. Merrill.*

Dunkelrot, Flügeldecken glänzend, tief schwarz. Rüssel fein punktiert. Stirn mit Grübchen. Halsschild quer, auf der Scheibe fast glatt, nach den Seiten zu mit allmälig deutlicher werdender Punktierung, die Punkte längs des Hinterrandes am grössten. Schildchen klein, länglich viereckig, am Hinterrande etwas abgerundet, rot. Flügeldecken mit etwas ausgebreitetem Spitzenrand, punktiert gestreift, das vom 4. und 5. Streifen eingeschlossene Spatium in der vorderen Hälfte breiter als die es einschliessenden, die Streifen vom 5. ab stärker eingedrückt und ihre Spatien leicht rippenartig vortretend. Unterseite glänzend rotbraun. Vorderbrust zwischen den Mittelhüften, ein grosser, flacher, ovaler Eindruck, gemeinsam auf dem 1. und 2. Bauchsternit, sowie die Mitte des Analsternites dichter und deutlicher punktiert als die übrige Unterseite und fein gelblich und sparsam behaart.

Mir liegt ausser dieser Art noch eine zweite dieser Gattung vor, die ersterer so ähnlich ist, dass sie am besten gleich an dieser Stelle charakterisiert wird.

4a. **Nanoplaxes ferruginea** sp. nov.

N. merrilli simillima, sed unicolor, ferruginea; prothorace omnino, linea mediana levi excepta, punctato; scutello fere quadrato; elytris fortius punctato-striatis, spatio tertio includentibus haud latiore.

Hab. INDIA ORIENTALIS, Pegu (ex coll. Gehr. *Dr. Wilhelm Müller,* Jena).

In Grösse und Körperform vollkommen der *N. merrilli* gleich und von ihr nur durch rotbraune Körperfärbung, kräftige zerstreute Punktierung des Halsschildes, die nur eine glatte Mittellinie frei lässt, gleichmässiger und stärker punktierte Deckenstreifen, nicht breiteres drittes Spatium, kürzeres, fast quadratisches Schildchen und fehlende Behaarrung auf den dichter punktierten Stellen der Körperunterseite unterschieden.

5. **Cyamobolus (?) palawanicus** sp. nov. (fig. 2, 2a, 2b).

Fuscus, dense albido- ac maculatim fuscescenti ferrugineo-squamosus; rostro subrecto, apicem versus paulo attenuato ac denudato, hic linea mediana levi, fronte inter oculos puncto impresso; prothorace latitudine longiore, basi bisinuato, lateribus in duabus trientibus basalibus fere parallelis dein convergentibus, disco macula quadrata fusca, per lineis cruciatis plus minusve in maculis quatuor subquadratis divisa; scutello minuto, rotundato, glabro; elytris albido-, macula basali, majore, transversa alterisque minoribus utrinque ad humeros, ad marginem lateralem, ante medium et pone suturae dimidiam partem posteriorem, fusco-squamosis, punctato-striatis, punctis remotis, striis duabus exterioribus fortius impressis, spatio octavo carinulato; corpore subter aequaliter ochraceo-squamoso, squamulis concoloribus, dissociatis, remotis, tibiis margine exteriore ad basin obtusangulariter flexo.

2 2a 2b

FIG. 2.

Long. 8, lat. 3.6 mm.

Hab. PALAWAN, legit *E. D. Merrill* (Bur. Sci. Acc. No. 6108).

Rotbraun, dicht kreideweiss beschuppt, mit rostbraunen, schwärzlich gekernten Flecken auf der Halsschildscheibe und an den Deckenwurzeln. Rüssel kürzer als der Halsschild, nur so lang wie die Halsschildseiten, vom Hinterrande bis zur Ausrandung über den Augen gemessen, etwas flachgedrückt und nach der Wurzel zu leicht verbreitert, diese mit feiner Mittelleiste und schmutzig weiss, mässig dicht beschuppt, Rüsselrücken im mittleren Teile der Mittellinie glatt, im übrigen ziemlich kräftig punktiert. Erstes Geisselglied länger und etwas dicker als das zweite, die folgenden fünf sehr kurz, das fünfte quer, Keule elliptisch, ungefähr so lang wie die fünf vorhergehenden Geisselglieder zusammen. Stirn zwischen den Augen mit eingestochenem Grübchen. Halsschild wenig breiter als lang, sein Vorderrand über den Kopf vorgezogen, der Hinterrand zweibuchtig, Oberseite dicht beschuppt, mit zerstreuten gröberen Punkten, der Vorder- und der Seitenrand in der vorderen Hälfte, sowie eine ungefähr quadratische Makel auf der Halsschildscheibe chocoladebraun beschuppt, letztere ist durch eine kreuzförmige weisse Linie mehr oder weniger in vier Makeln, mit schwärz-

lichem Kern, geteilt. Flügeldecken nur an der Wurzel mit anscheinend konstanter grösserer dunkelbrauner Quermakel, sonst vorherrschend weisslich beschuppt, nur beiderseits der Naht, hinter der Mitte, mit je einem grösseren Punkt und im Spitzenteil mit wenigen Pünktchen von rotbrauner Farbe, ausserdem mit blassbraunen Nebelflecken. Die Deckenstreifen stellen sich als Punktreihen mit isolierten Schüppchen dar, nur die zwei vorletzten und die Spitze der zwei, diesen vorhergehenden Streifen sind eingedrückt. Der äusserste Streifen ist in der hinteren Hälfte abgekürzt, der vorletzte im mittleren Teil stärker eingedrückt, so dass das vorletzte Spatium, das einige undeutliche gereihte Körnchen aufweist, in der hinteren Hälfte gekielt erscheint. Unterseite ziemlich dicht mit runden, nicht sehr kleinen, gelblich weissen Schuppen, von denen einige isoliert stehen, bedeckt.

Da die Stellung der Art in der Gattung *Cyamobolus* unsicher ist, so sei noch erwähnt, dass die Mittelbrust, ähnlich wie bei *Sclerolips* gebildet, die Hinterbrust in der Mittellinie kürzer als das erste Bauchsternit und dessen Hinterrand stumpfwinkelig ist. Das zweite Sternit ist länger als die zwei folgenden Bauchsternite. Schenkel ziemlich gleichbreit, unterseits nicht gefurcht, die hinteren das 3. Bauchsternit nicht überragend, alle stumpf gezähnt, Schienen linear, ihr Aussenrand an der Wurzel stumpfwinkelig geknickt, 2. Tarsenglied fast quadratisch, das dritte stark zweilappig.

6. **Asytesta philippinica sp. nov.**

Aterrima, opaca, rostro creberrime punctato, dorso in dimidia parte apicali basique utrinque lateribus carinulatis; prothorace latitudine basali paulo longiore, lateribus fossulatim, supra antice sat dense ac minute punctatis, punctis basin versus majoribus, omnibus setula albida, antrorsum directa, minutis; scutello minuto, subquadrato, intruso; elytris latitudine basali vix sesqui longioribus, basi truncatis et hic anguste albido-squamosis, reliquis atomis albidis parce adspersis, striato-fossulatis, stria prima in parte apicali abbreviata, secunda tertiaque eo loco punctatis, fossulis spatiis latioribus, spatio secundo in triente mediano cristato, ut reliquis remote ac minute seriato-granulosis; metasterno dense ochraceo piloso; femoribus posticis dimidia parte abdominis ex apice extantibus, granulis remotis, setuligeris obsitis.

Long. 7–8, lat. 2.9–3.5 mm.

Hab. SAMAR, legit *J. Whitehead*, altitudine 500 ped. (Mus. Dresdense) et LUZON, Laguna, Calauang, legit *R. C. McGregor* (Bur. Sci. Acc. No. 14206).

Matt schwarz, Rüssel sehr dicht punktiert, in der Apicalhälfte mit Mittelleiste, in der Basalhälfte mit Seitenrandleisten und daselbst spärlich mit nach vorn gerichteten Börstchen besetzt, die auf der Stirn noch zerstreuter stehen. Fühler bräunlich, das zweite Geisselglied länger als das erste, die übrigen Glieder, vom dritten ab, an Länge abnehmend, das letzte kugelig, die Keule etwas länger als die drei vorhergehenden Glieder, gestreckt elliptisch. Halsschild etwas länger als an der Basis breit, vorn verjüngt und vorgezogen, die grösste Breite hinter der Mitte, von da nach der Basis zu nur sehr wenig verengt, im vorderen Drittel fein zerstreut, nach hinten zu mit allmälig gröber werdenden Punkten, an den Seiten mit entfernten Grübchen, alle mit kurzem, nach vorn gerichtetem Börstchen. Flügeldecken grubig gereiht-punktiert, die Spatien viel schmäler als die Streifen und entfernt gereiht-gekörnelt, alle Punkte und Körnchen mit weisslichem Börstchen, die erste Reihe im Spitzenviertel abgekürzt, die zweite und dritte daselbst mit kleinen Punkten, das zweite Spatium im mittleren Drittel mässig hoch kammartig erhaben, Deckenwurzel mit feiner Querlinie, aus weisslichen Schüppchen. Hinterbrust schmutzig gelb, kurz beborstet, mit zerstreuten weisslichen Schuppenbörstchen. Abdomen schwärzlich tomentiert, namentlich das erste Bauchsternit mit zerstreuten weisslichen Schüppchen, hintere Hälfte des 2.–4. Bauchsternites kahl. Beine lang, die hinteren mit der Hälfte die Decken überragend, mit spärlichen, weisslichen Börstchen. Vorderschienen des Männchens leicht geschwungen, innen lang schwarz bewimpert.

Diese Art ist bemerkenswert da sie die erste ist, die aus dem malayischen Gebiete bekannt wird, alle übrigen Arten gehören der papuanischen Fauna an.

7. **Sclerolips ochrodiscus** sp. nov.

Niger, cinerascenti-nigro-squamosus, elytris nebulis nigro-, plaga thoracali medio basali, scutelloque ochraceo-squamosis; rostro depressiusculo, punctato, dorso late glabro, in triente basali carinula mediana; antennis refescentibus, postmedianis, scapo funiculo multo breviore, funiculi articulis tribus basalibus elongatis; prothorace squamulis majoribus ac obscurioribus punctatim adsperso; elytris in striis etiam squamosis, squamulis remote seriatis, dissociatis; segmento abdominali secundo tertio paulo longiore, tarsorum articulo primo fortiter elongato, secundo oblongo.

Long. 6.2–7.5, lat. 2.5–3.2 mm.

Hab. LUZON, Cap Engaño, legit *J. Whitehead* (in Mus.

Dresdense), et INSULA CALAYAN, legit *R. C. McGregor* (Bur. Sci. Acc. No. 649).

Bräunlich schwarz, eine eiförmige, oder fast quadratische Makel in der Mitte auf der hinteren Halsschildhälfte, sowie das Schildchen dicht ockergelb beschuppt, Flügeldecken mit einigen sammetschwarzen Nebelflecken. Rüssel schlank, flach gedrückt, auf dem Rücken glatt, nur im Basaldrittel mit feiner Mittelleiste, im übrigen ziemlich kräftig punktiert. Fühler rotbraun, hinter der Mitte eingefügt, der Schaft die Augen nicht erreichend, viel kürzer als die Geissel, diese mit drei verlängerten Basalgliedern, von denen das zweite das längste ist, Keule kaum länger als die drei vorhergehenden Glieder zusammen. Halsschild quer, die Seiten in der Basalhälfte nach vorn leicht divergierend, dann convergierend, die Basis zweibuchtig, Oberseite dicht bräunlich schwarz beschuppt und ausserdem mit etwas grösseren mehr abstehenden Schüppchen entfernt übersät. Schildchen klein, eiförmig, gewölbt. Flügeldecken an der Wurzel dreibuchtig und daselbst etwas breiter als die Halsschildbasis, die verrundeten Schulterecken sehr wenig vorgezogen, gereiht-punktiert, jeder Punkt mit einem isolierten Schüppchen, auch längs der Mitte der Spatien mit einer Reihe ähnlicher Schüppchen, zweites Spatium dicht hinter der Wurzel mit einer länglichen, sehr flachen Schwiele, die sowie eine unregelmässige Querbinde hinter der Deckenmitte und einige Nebelflecken in der Spitzenhälfte sammetschwarz beschuppt sind, 8. Spatium, namentlich in der hinteren Hälfte, leicht kielförmig erhaben, mit einer Reihe sehr kleiner, glänzender Körnchen. Unterseite dicht bräunlich schwarz beschuppt, Schenkel linear, ihre grösste Breite an der Wurzel, gezähnt, mit Furche zur Aufnahme der Schienen, Tarsen schlank, doch kürzer als die Schienen, rötlich, ihr erstes Glied mindestens so lang wie das Klauenglied, das zweite doppelt so lang wie an der Spitze breit.

Ich weiss diese Art in keine andere Gattung zu bringen wie in diese, mit der sie zweifellos nahe verwandt ist, aber sich von ihr dadurch unterscheidet, dass das zweite Bauchsternit nur wenig länger ist als das dritte, was später wohl die Errichtung einer neuen Gattung veranlassen wird.

8. **Endymia philippinica** sp. nov. (♀ !)

E. marmoratae Kirsch simillima, differt: elytris postice minus attenuatis, spatiis remote subtiliterque granulatis, scutello transverso, prothorace utrinque lateribus plus rotundatis, ante medium tuberculo rectangulari scutelloque transverso.

Long. 9.5, lat. 4 mm.

Hab. INSULÆ PHILIPPINÆ (sine patria exacta) ex coll. *Dr. Baden* (in Mus. Dresdense), et LUZON, Lamao, Bataan, legit *H. E. Stevens* (Bur. Sci. Acc. No. 9801).

Die durch die Fühlerbildung sehr charakteristische Gattung hatte bisher nur papuanische Arten aufzuweisen:

Endymia vipio PASC., Journ. Linn. Soc. (1871), 11, 200, Pl. VIII, figs. 5, 5a, 5b, 5c. Batjan, Dorey.
Endymia geminata PASC., Journ. Linn. Soc. (1873), 12, 43, Pl. I, figs. 13, 13a. Batjan.
Endymia marmorata KIRSCH (*Blepiarda*), Mittheil. Mus. Dresden (1877), 155. Neuguinea, Rubi.
Endymia effusa FAUST, Ent. Zeitg., Stettin (1890), 51, 190. Aru.

Die neue Art von den Philippinen steht der Fühlerbildung nach *E. marmorata* am nächsten, sieht ihr auch durch ihr Schuppenkleid sehr ähnlich, unterscheidet sich aber nicht nur von ihr, sondern von allen anderen Arten der Gattung durch den breiteren, nicht konischen Halsschild und die relativ kürzeren, hinten weniger verjüngten Flügeldecken. Da mir nur zwei Weibchen der neuen Art vorliegen (die Männchen sind durch verlängerte Vorderbeine und bewimperte Tarsen ausgezeichnet), so kann auch nur das Weibchen von *E. marmorata* zum Vergleich herangezogen werden; dieser zeigt, dass das zweite Geisselglied bei beiden Arten verlängert und etwas länger als die fünf folgenden Geisselglieder zusammen ist, dass aber die Keule, die bei *E. marmorata* nur so lang wie die sechs vorhergehenden Glieder ist, bei *E. philippinica* der ganzen Geisselläge gleichkommt. Halsschild an der Wurzel ein und ein Drittel mal so breit wie in der Mittellinie lang, am Vorderrande schmäler als die halbe Basis, im ersten Drittel mit einer Querreihe von undeutlichen Höckern, von denen die äusseren rechtwinkelig sind und nur sehr wenig über den Seitenrand vorragen. Die dichte Beschuppung des Halsschildes ist durch sehr grobe, zerstreute, borstenähnliche Schüppchen tragende Punkte unterbrochen und lässt beiderseits der Mittellinie an der Wurzel einen Quereindruck erkennen. Schildchen deutlich quer, kahl, dunkelbraun. Flügeldecken ganz wie bei *E. marmorata* scheckig beschuppt, die Schultern in grösserer Ausdehnung weisslich, 2. Spatium in der vorderen Hälfte mit zwei entfernten, Naht hinter der Mitte mit zwei gemeinsamen und der Spitzenteil der Decken mit nebelfleckigen, sammetartig braun beschuppten Erhabenheiten, die Spatien aber im Gegensatz zu *marmorata* mit sehr kleinen, entfernten Körnchen, die ein von hinten her eingestochenes, weisses Börstchen tragen. Unterseite spärlich weiss, Schenkel dichter beschuppt, letztere vor der Spitze mit undeutlicher dunkler

Querbinde, drittes Tarsenglied röter als die übrigen mehr bräunlichen.

Endymia effusa Faust.

Diese Art kommt nach einem mir vorliegendem, von J. Whitehead auf der Insel Samar in einer Höhe von 500 Fuss gesammelten Exemplare auch auf den Philippinen vor. Sehr wahrscheinlich fällt diese Art mit *vipio* Pasc., die Faust eben so wenig wie ich in Natura kannte, zusammen und sind die von Faust erwähnten Unterschiede nur auf verschiedenen Erhaltungszustand zurückzuführen, Sicherheit darüber kann jedoch nur ein Vergleich der Typen mit einander geben.

9. Metialma obsoleta sp. nov.

Nigra, squamulis setiformibus, ochraceis, sat dense tecta, elytris utrinque ante medium et ante apicem plaga nigricante, obsoleta; rostro apice obscure sanguineo, basi quinque carinulato, parce squamuloso; prothorace crebre punctato, disco parcius tomentoso, obscuriore; scutello minuto, intruso, ochraceo; elytris in striis, sat profundiis, indistincte punctatis, basi, in parte suturali concavis, aequaliter ochraceo-tomentosis, singulis plagis duabus transversis, nigricantibus; propygidio parce albido squamoloso, pygidio parce ochraceo-piloso; corpore subter pedibusque concoloribus.

Long. 5.5–5.7, lat. 3 mm.

Hab. MINDORO, Magaran, legit *C. M. Weber* (Bur. Sci. Acc. No. 13435).

Alle bisher beschriebenen indo-malayischen Arten der Gattung sind durch auffallend heller tomentiertes Schildchen und eben solche Nahtspitze ausgezeichnet, während die vorliegende philippinische Art die Oberseite gleichmässig schmutzig gelb tomentiert und nur auf den Flügeldecken je zwei undeutliche, schwärzliche Quermakeln zeigt. Rüssel in der Apikalhälfte rotbraun, unpunktiert, an der Wurzel spärlich ockergelb beschuppt, mit fünf, durch Punktstreifen getrennte Längsleisten. Fühler bräunlich, das erste und zweite Geisselglied verlängert, das zweite länger als das erste, alle folgenden quer, mit spärlichem Borstenkranz, bis zur rotbraun tomentierten Keule an Breite zunehmend, das letzte dieser angeschlossen. Halsschild dicht und fein raspelartig punktiert, mit kurzem Haarkleid, beiderseits der Scheibe mit undeutlicher, dunklerer Längsmakel. Flügeldecken mit tiefen, aber feinen und sehr entfernt punktierten Streifen, von denen der 7., 8. und 9. an der Schulter abgekürzt, der 3. und 8. vor der Spitze mit einander vereinigt sind, nur

der 9. und 10. erreicht den Spitzenrand. Jede Decke jederseits vor der Mitte und vor der Apikalschwiele mit unregelmässigem bräunlich schwarzem Querfleck. Propygidium und Pygidium mit Mittelkiel, ersteres mit weisslichen, rundlichen Schüppchen, letzteres sehr fein schmutzig gelb behaart. Unterseite gleichmässig einfarbig lehmgelb behaart-beschuppt. Erstes Bauchsternit des Männchens mit breiter Längsfurche, das Analsternit mit grossem, rundem Grübchen.

10. Nauphaeus sexmaculatus sp. nov.

Niger, squamulis nigris luteisque tectus, elytris singulis guttis quatuor, una humerali,, una marginali, postmediana, altera discali, minuta et una apicali majore ut corpore subter dense lutescenti-albido-tomentosis; femoribus anticis in triente apicali, tibiis anticis totis, nigris.

Long. 9, lat. 4 mm.

Hab. PALAWAN, Iwahig, legit *C. H. Lamb* (Bur. Sci. Acc. No. 12541).

In Gestalt und Skulptur dem *N. linearis* Hell. [Ent. Zeitg., Stettin (1908), 179], ähnlich, oberseits mit bräunlich schwarzen und schmutziggelben Schüppchen dicht und gleichmässig gesprenkelt, nur die Mittellinie des Halsschildes, vier Deckenmackeln und die Unterseite ganz schmutzig weiss beschuppt. Rüssel nur in der Basalhälfte spärlich beschuppt, sonst kahl, in der Apicalhälfte mässig dicht und kräftig punktiert, an der Wurzel leicht längsrunzelig, mit wenigen zerstreuten, groben Punkten. Kopf dicht punktiert, die gelblichen Schüppchen nur an den Augenrändern dichter stehend als die schwärzlichen. Halsschild in der Mittellinie länger als an der zweibuchtigen Wurzel breit, die Seiten nach vorn leicht convergierend, die Mittellinie, namentlich in der vorderen Hälfte leicht eingedrückt. Schildchen kurz elliptisch, von der Naht eingeschlossen, gelblich tomentiert. Flügeldecken elliptisch, an der Wurzel nicht breiter als die Halsschildbasis, hinter den Schultern sehr wenig erweitert, fein punktiert gestreift, die Naht in den vorderen zwei Dritteln, erstes und zweites Spatium in der vorderen Hälfte entfernt gereiht-gekörnt, 4. Spatium an der Wurzel mit einem gelblichen Längsstrich, hinter der Mitte mit einem ähnlichen, aber viel kleineren, vor der Spitze mit einer grösseren, die äusserste Spitze von fünf Spatien bedeckenden Makel. Unterseite dicht gelblich, Vorderschenkel im Spitzendrittel, die Vorderschienen ganz, die Mittel- und Hinterschienen nur aussen an der Spitze schwarz beschuppt.

11. Cercidocerus flavopictus sp. nov. (fig. 3).

Fuscescenti-niger, supra vittis, fascia plagisque stramineis ornatus; rostro apice glabro et sat crebre, reliquo tomentoso ac parce punctato; prothorace vittis duabus dorsalibus, antrorsum convergentibus, vittaque laterali, tenuiore, ab angulos posticos usque ad medium extensa, stramineis; scutello toto, sutura in dimidia parte basali apiceque, macula transversa post humeros, fascia undulosa postmediana, ad suturam breviter interrupta, lineolaque ad apicem in spatio quarto, stramineo- reliquo fuscescenti-nigro-tomentosis; corpore subter albido, plaga laterali in metasterni lateribus, in episternis expansa, vitta prosternali utrinque ante coxis anticis fuscescentibus; segmentis abdominalibus tertio et quarto lateribus, ultimo toto, nigricantibus.

Long. (sine rostro) 15, lat. 6.2 mm.

Hab. MINDANAO, Agusan River, legit *A. Celestino* (Bur. Sci. Acc. No. 12524).

Dem *C. heros* Pasc. [Ann. & Mag. Nat. Hist. (1883), V, 19, 377, Pl. XI, fig. 3], zufolge der relative feinen Halsschildskulptur und der Anlage der Zeichnung verwandt. Rüssel mit haarfeiner, in der kahlen Spitzenhälfte erlöschenden Mittelleiste, daselbst fein und dicht in der Basalhälfte feiner und zerstreuter punktiert und rostgelb tomentiert, über den Augen ein mit der Rüsseltomentierung zusammenhängender Querstreifen ebenfalls so gefärbt. Fühlergeisselglied 3 und 4 stark quer, kürzer als das ebenfalls quere fünfte, Keule schwärzlich, so lang wie breit, beilförmig (Weibchen!). Halsschild zerstreut und fein punktiert, mit feiner Mittellinie, beiderseits der Scheibe mit je einem, nach der Wurzel zu divergierenden und hinten verbreiterten Längsstreifen, an den Seiten ein eben solcher, aber kürzerer, der unterhalb den Hinterecken beginnt und nach vorn sich verjüngend, bis zur Mitte des Seitenrandes reicht, beide strohgelb tomentiert. Schildchen rostbraun, spitz dreieckig. Flügeldecken mit 9 ganzen, feinen, einfachen Streifen, der erste an der Spitze etwas nach aussen gebogen, so dass die Naht daselbst verbreitert ist, die Spatien fein zerstreut-punktiert. Die Basalhälfte und das Spitzenviertel der Naht, die äusserste Wurzel des 1. und 2. Spatiums, eine von der Mitte des dritten Spatiums bis zum 7. Streifen nach aussen reichende, grosse Quermakel, im vorderen Deckendrittel, je eine nach aussen verbreiterte, leicht s-förmig geschwungene Querbinde, die fast bis zur Naht und nach aussen bis zum 7. Streifen reicht, sowie ein kurzer Längsstreifen, im

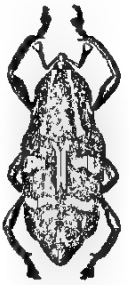


FIG. 3.

Spitzenviertel des vierten Spatiums, strohgelb tomentiert. Pygidium in der Basalhälfte mit gröberen Punkten, in der Mittellinie mit kurzen rostfarbigen Börstchen. Unterseite vorherrschend gelblich weiss tomentiert, ein von den Vorderhüften nach dem Vorderrande der Vorderbrust ziehender Streifen, die Seiten der Hinterbrust und mit ihr der angrenzende Teil der Hinterbrustepisternen, eine quere Makel je an den Seiten des 3.–4. Bauchsternites, das letzte fast ganz schwärzlich, Mittellinie des Abdomens mit einer Längsreihe von Kahlflecken.

12. **Ommatolampus hæmorrhoidalis var. pygidialis nov.**

Differt a specie typica: pygidio toto rufo-ferrugineo.

Long. 27, lat. 7 mm.

Hab. PALAWAN, Iwahig, legit *C. H. Lamb* (Bur. Sci. Acc. No. 13212.)

Von der Stammart allein nur durch das oberseits gelbrote Pygidium verschieden.

13. **Eutornus luzonicus sp. nov. (fig. 5, 5a).**

Aterrimus, nitidus, longirostri Faust affinis, sed minus elongatus, corporis in forma crenato Faust fere aequali; rostro basin versus, paulo angustato, ante antennarum insertionem paulo latiore, sat crebre, retrorsum sensim fortius punctato, dorso inter antennas canalicula brevi; prothorace maxima latitudine basin propiore, latitudine paulo longiore, sat dense, basin versus majus punctato; scutello transverso-ovali; elytris prothorace latioribus, latitudine duplo tertiaque parte longioribus, striato-punctatis, stria prima impressa, spatio octavo in parte apicali convexo, reliquo ut spatio nono decimoque acute tenuique carinulatis; corpore subter remote punctato, sternito anali punctis majoribus.

Long. 9.2, lat. 2.2 mm.

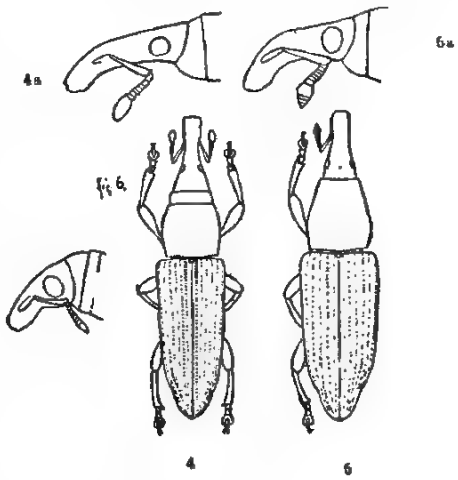
Hab. LUZON, Montalban Gorge, Rizal, legit *W. Schultze*, et Los Baños, legit *C. F. Baker*.

Glänzend schwarz, Rüssel so lang wie der Halsschild, leicht gebogen, Fühlerinsertion dicht vor der Mitte, der davor liegende Teil ziemlich parallelseitig und etwas breiter als der basale Rüsselteil, Punktierung ziemlich dicht und kräftig, Rüsselrücken zwischen der Fühlerinsertion mit undeutlichem, kurzem Längseindruck, zwischen den Augen mit Grübchen. Kopf vor der Einschnürung grob punktiert. Die Entfernung vom Augenhinterrand beträgt weniger als der Augendurchmesser. Fühlerschaft kräftig, alle Geisselglieder quer, die Keule kreiselförmig, ihre grösste Dicke näher der Basis. Halsschild wenig länger

als breit, seine grösste Breite näher der Basis, Vorderrandabschnürung oberseits seicht, in der Mitte unterbrochen, die ziemlich dichte Punktierung nach der Halsschildwurzel zu unmerklich gröber werdend. Schildchen klein, quer, etwas trapezoidal. Flügeldecken im Spitzenteil verengt, die nach der Spitze zu verbreiterte Naht leicht dachförmig gewölbt, die erste Punktreihe ganz, die übrigen Reihen, die kaum der Hälfte eines Spatiums an Breite gleichkommen, nur an der Spitze streifenartig eingedrückt, namentlich der dritte Streifen im Spitzenfünftel tief gefurcht, das zweite und achte Spatium daselbst wulstartig vortretend, letzteres, ausgenommen im basalen Viertel, das 9. und 10., namentlich in der Basalhälfte, mit sehr feiner Längsleiste. Im übrigen alle Spatien mit kaum wahrnehmbarer, zerstreuter Punktierung. Mittelbrust kräftig und dicht, Hinterbrust spärlicher, Abdomen feiner, im mittleren Teil undeutlich, Analsternit in der Basalhälfte grob punktiert, sein Seitenrand mit kleineren Punkten, die Apikalhälfte fast ganz glatt. Schenkel fein punktiert, etwas längsrunzelig, Schienen längsstreifig.

14. **Eutornus stricticollis** sp. nov. (fig. 4, 4a).

Praecedenti (E. luzonico) parum affinis; paulo minor, plus angustatus; rostro longiore, parte apicali apicem versus distincte dilatata, crebre, basin versus majus punctato, dorso inter antennas canalicula, fronte foveola; capite temporibus oculorum diametrum longioribus; prothorace lateribus aequaliter ac modice rotundatis, maxima latitudine in medio, crebe punctato, margine antico circum fortiter constricto, disco linea mediana levi; elytris similiter ut in luzonico, sed striis fortius punctatis, stria prima punctis basalibus transversis, spatio secundo striis confinibus vix latiore; corpore subter omnino dense punctato.



FIGS. 4, 5, 6.

Long. 8, lat. 1.9 mm.

Hab. LUZON, Montalban Gorge, Rizal, legit *W. Schultze* (Bur. Sci. Acc. No. 5196).

Dem *E. luzonicus* ähnlich, aber kleiner und gestreckter, der Rüssel länger und im Spitzenteil deutlich nach vorn verbreitert, dicht, nach der Wurzel zu gröber punktiert, zwischen der Fühlerinsertion, auf dem Rücken, mit kurzer, seichter Längsfurche, zwischen den Augen mit eingestochenem Punkt. Fühler rötlich braun, alle Geisselglieder quer, Keule elliptisch (bei *E. luzonicus* kreiselförmig). Halsschild, auch ohne der Vorderrandabschnürung, länger als breit, die Seiten gleichmässig und schwach gerundet, gleichmässig dicht punktiert, die Scheibe mit glatter Mittellinie, Vorderrand ringsum stark abgeschnürt. Schildchen klein, quer, trapezoidal. Flügeldecken wie bei *E. luzonicus*, nur gestreckter, mehr gleichbreit und mit gröberen Punktreihen, die Punkte an der Wurzel der ersten Reihe quer, das zweite und dritte wenig breiter als die anliegenden Punktreihen. Unterseite mässig dicht punktiert, 3. und 4. Bauchsternit im mittlerem Teil, Analsternit am Vorder- und Hinterrande glatt. Schenkel punktiert, Schienen längsstreifig.

15. **Eutornus rufobasalis** sp. nov. (fig. 6).

Niger, metasterno, abdomine elytrorumque basi rufo-brunneis; rostro prothorace multo breviore, latitudine vix sesqui longiore, equilato, subtiliter punctato; antennis pone oculos insertis, scapo clavato, funiculo articulis transversis, latitudine sensim crescentibus, clava conica, funiculi articulo ultimo vix latiore; prothorace oblongo, sat dense subtiliterque punctato, linea mediana, triente basali excepta, levi, margine antico constricto; scutello minuto, rotundato, elytris, sutura excepta, in triente basali rufis, punctato-striatis, sutura basin versus paulo dilatata, stria sexta septimaque tenuibus, haud impressis, antice abbreviatis, spatio paenultimo in parte apicali convexo; corpore subter metasterni lateribus distincte, abdomine subtilius punctatis, sternitis abdominalibus tertio quartoque, lateribus exceptis, glabris.

Long. 6, lat. 1.5 mm.

Hab. LUZON, Los Baños, legit *C. F. Baker*.

Glänzend schwarz, die Flügeldecken, die Naht ausgenommen, im vorderen Drittel, sowie die Hinterbrust und das Abdomen braunrot. Rüssel viel kürzer als der Halsschild, kaum doppelt so lang wie breit, sehr fein zerstreut punktiert. Fühler vor den Augen eingefügt, Schaft gebogen, den Hinterrand des Auges erreichend, die Geisselglieder quer an Breite zunehmend, das letzte so breit wie die Wurzel der konischen Keule. Entfernung des Augenhinterrandes von der Kopfeinschnürung etwas geringer als der kürzere Augendurchmesser. Halsschild länger als breit, an den Seiten gleichmässig und schwach gerundet, überall

fein mässig dicht, aber ziemlich tief punktiert, in den vorderen zwei Dritteln mit glatter Mittellinie, Vorderrand breit abgesetzt, Hinterrand gefurcht. Flügeldecken nicht breiter als der Halsschild, cylindrisch, mit feinen Punktstreifen, sechster und siebenter Streifen nur gereiht-punktiert, vorn abgekürzt, jede Decke an der Wurzel mit dunkelroter Längsmakel, die innen das erste Viertel des ersten Streifens tangiert, aussen aber fast bis zur Mitte des Aussenrandes nach hinten reicht so dass ihr Hinterrand schräg verläuft. Vorletztes Spatium im Spitzenteil mit dem zweiten vereinigt und daselbst gewulstet. Unterseite an den Seiten der Hinterbrust deutlich, der Hinterleib feiner punktiert, das dritte und vierte Sternit im mittleren Teil glatt.

AMPHICORDUS genus novum

Brenthidarum (*Amorphocephalidarum*)

Caput breve, transversum, post oculos constrictum. Rostrum capite duplo longiore, maris depressiusculum, dorso sulcatum, apicem versus vix dilatatum, feminae cylindricum. Antennae validae, prothoracis basin haud attingentibus, articulis 2.–4. subtransversis, articulo apicali acuminato, duabus praecedentibus unitis aequilongo. Prothorax oblongo-ovatus. Elytra prothorace plus capite breviora, supra levia. Metasternum abdomine aequilongum, segmenta abdominali 1. et 2. elongata, 3. et 4. brevissima. Femora valida, brevia compressa, subter ante apicem spinosa, postica segmento abdominali secundo haud superantia. Tibiae anticae curvatae, intermediae posticaeque compressae, apicem versus fortiter dilatatae, tarsi articulis basalibus brevibus, quinto reliquis aequilongo.

Kopf quer, hinter den Augen ringsum abgeschnürt, Rüssel ungefähr doppelt so lang wie der Kopf, flachgedrückt, ziemlich gleich breit. Fühler kräftig, die Halsschildwurzel bei weitem nicht erreichend, die einzelnen Glieder vom 2. ab quer, oder wenig breiter als lang, Endglied zugespitzt doppelt so lang wie breit. Halsschild gestreckt elliptisch. Flügeldecken walzenförmig, unverhältnismässig kurz, wenig länger als der Halsschild, nur an der Wurzel mit Suturalstreifen, sonst oberseits glatt, an der Spitze abgerundet. Hinterbrust so lang wie das Abdomen, das 1. und 2. Bauchsternit verlängert, das 3. und 4. sehr kurz, zusammen kaum so lang wie das halbe zweite. Schenkel kurz, zusammengedrückt, die hinteren das zweite Bauchsternit nicht überragend, unterseits in der Mitte mit Dorn. Schienen gekrümmt, Mittel- und Hinterschienen nach der Spitze zu verbreitert.

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16. **Amphicordus inproportionatus** sp. nov. (fig. 7).

Nitidus, rufo-fuscescens, antennis subcompressis, articulo primo crasso, secundo transverso, reliquis longitudine paulo crescentibus, nono octavo paulo breviore; elytris ad basin stria suturali tenui, nigro-punctatis, stria octava tenuissima, nona fortiter impressa, in dimidia parte antica abbreviata, decima integra, in dimidia parte postica nonaque unita, spatio inter nonam et decimam striam in dimidia parte postica costato, in medio et ad apicem guttis fulvis, alteris guttis in spatio secundo ad basin et post medium, in spatio tertio in primo triente et in spatio quarto post medium; corpore subter obscure rufo, glabro.

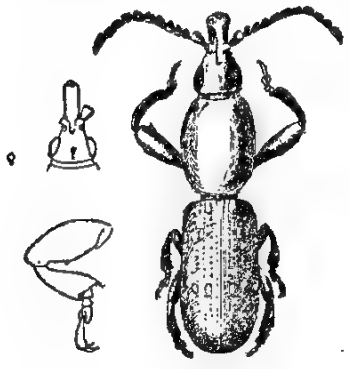

FIG. 7.

Long. 8–9, lat. 2 mm.

Hab. MINDANAO, Port Banga, legit *W. J. Hutchinson* (Bur. Sci. Acc. Nos. 8852, 12003).

Stark glänzend, dunkel rotbraun, durch die unverhältnismässig kurzen, glatten Decken auffallend. Rüssel beim Männchen mit Dorsalfurche, beim Weibchen hinter der Fühlerinsertion mit Eindruck, Scheitel in beiden Geschlechtern mit Medianeindruck. Fühler ziemlich dick, den Halsschildhinterrand bei weitem nicht erreichend, erstes Glied sehr dick und mindestens so lang wie das Endglied, das zweite quer, nach innen erweitert, die folgenden, bis zum fünften, etwas an Länge zunehmend, das achte kleiner als die es einschliessenden Glieder. Halsschild glänzend, glatt. Flügeldecken glatt, nur an der Wurzel mit Subsuturalstreifen, mit dunklen Punktreihen, von denen die 8. Reihe leicht, die 9. in der hinteren Hälfte stark eingedrückt ist, der zwischen ihnen liegende Zwischenraum ist gewulstet, verengt sich aber plötzlich vor dem Spitzenrand der Decken und zeigt vor der Mitte und vor seinem Ende eine gelbe Makel. Ähnliche Längsmakeln finden sich an der Wurzel und hinter der Mitte des zweiten Spatiums, im ersten Drittel des dritten Spatiums und hinter der Mitte auf dem vierten Spatium.

HENARRHODES genus novum

Brenthidarum (*Belopheridarum*) *prope Arrhenodes*

Antennae maris thorace plus elytris fere aequilongae, articulo ultimo longissimo, ante medium rostri insertae; caput longitudine

latiore, trapezoidale, ad basin constrictum, utrinque carinatum. Rostrum prothorace aequilongum, maris apice dilatatum. Elytra apice subtruncata, angulo externo dentato. Femora postica elytrorum apicem attingentia. Tarsi elongati, articulo primo ultimo paulo breviore.

Die Gattung unterscheidet sich von allen Belopheriden dadurch, dass die Hinterschenkel das zweite Abdominalsternit überragen und die Deckenspitze erreichen; von allen Brenthini der ersten Gruppe Schönfeldts (Genera Insectorum) durch die langen Fühler, die so lang wie der Halsschild und die Flügeldecken zusammen sind. Kopf quer, trapezoidal, an der Basis abgeschnürt, so dass die Schläfen wie bei *Arrhenodes* ohrförmig abgerundet sind. Scheitel gewölbt. Rüssel lang, ohne Mandibel so lang wie der Halsschild, beim Männchen an der Spitze dreieckig verbreitert und daselbst nur wenig schmäler wie der Kopf. Mandibel mässig lang, sichelförmig. Fühler des Männchens vor der Rüsselmitte eingefügt, die ersten fünf Glieder an Länge zunehmend, die folgenden wieder allmälig abnehmend, so dass das vorletzte etwas kürzer als das vierte Glied ist, letztes Glied das längste. Halsschild gestreckt elliptisch, ungefähr 1½ mal so lang wie breit. Flügeldecken ähnlich wie bei *Arrhenodes*. Schenkel unterseits mit Dorn vor der Spitze, die hinteren die Deckenspitze erreichend. Die Tarsen lang, das erste Glied ¾ mal so lang wie das letzte, das zweite ungefähr 1½ mal so lang wie breit.

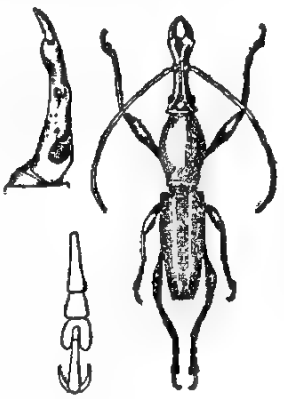

Fig. 8.

17. Henarrhodes macgregori sp. nov. (fig. 8).

Niger, prothorace, margine antico nigro excepto, rufo, elytrorum spatio secundo, apice excepto, fulvo; rostro dorso carinis duabus, retrorsum divergentibus; prothorace nitido, sulco basali; elytris punctato-striatis, stria prima (subhumerali) nona decimaque levibus, prima fortius impressa, stria nona in triente basali, stria decima in dimidia parte apicali abbreviatis.

Long. tot. ♂ 17–21, ♀ 14–17, lat. ♂ 3–3.8, ♀ 2–2.8.

Hab. Luzon, Benguet, Irisan River, legit *R. C. McGregor* (Bur. Sci. Acc. No. 1185).

Schwarz, Halsschild mit Ausnahme des schwarzen Vorderrandes, rot, zweites Deckenspatium, ausgenommen an der Spitze,

gelb. Rüssel des Männchens, ohne Mandibel, so lang wie der des Weibchens, 1½ mal so lang wie der Halsschild und cylindrisch; ersterer wie bei *Arrhenodes* und *Eupsalis* mit verbreiterter Spitze, sein Rücken mit zwei nach hinten divergierenden Längsleisten, die hinter den Augen im Bogen nach abwärts laufen; die Länge der ohrförmig abgesetzten Schläfen übertrifft nur um wenig den Augendurchmesser. Vor jedem Auge befindet sich, in beiden Geschlechtern, eine rundliche Erhabenheit, von ungefähr halben Augendurchmesser. Fühler vom 6. Glied ab ganz, die Basalglieder nur teilweise unterseits schwarz tomentiert. Flügeldecken an der Spitze etwas abgestumpft, die Aussenecke mit Zähnchen. Der erste Streifen an der Spitze mit dem neunten verbunden, glatt und tiefer eingedrückt, die übrigen, vom 2.–9. punktiert-gestreift. Der 9. Streifen ist im vordern Drittel, der 10. in der hinteren Hälfte abgekürzt, beide sind unpunktiert. Unterseite glänzend schwarz, nur die Hinterbrust und der Hinterleib in der vorderen Hälfte mit goldgelben Härchen spärlich, die Seiten der letzten drei Sternite dichter und mehr graulich fein behaart.

18. **Ocalemia prasina sp. nov.**

Viridi-metallica, femoribus, apice nigro-coeruleo excepto, rufis, tibiis, tarsis antennisque, articulis duabus ultimis cervinis exceptis, nigris; capite parte anteoculari, mandibulis haud computatis, parum transverso; fronte impressione aequilaterali-triangulari, glabra, reliqua sat rude, vertice subtiliter crebreque, collo remotius punctatis; prothorace subirregulariter, ad angulos posticos fortiter punctato, ad angulos anticos, ut vitta mediana, glabriusculis; scutello ferrugineo-piloso; elytris crebre fortiterque, apicem versus subtilius ac densius punctatis, apice oblique subsinuato-truncatis, marginibus subtilissime nigro-ciliatis; corpore subter plus aenescenti-viridi, sericeo, segmentis ultimis parum coerulescentibus.

Long. 20, lat. hum. 4.5 mm.

Hab. LUZON, Benguet, Baguio, legit *R. C. McGregor* (Bur. Sci. Acc. No. 11006).

Oberseite metallisch grün (wie bei *Gaurotes virginea*), die Schenkel, mit Ausnahme der schwärzlich stahlblauen Spitzen, gelbrot, Schienen, Füsse und Fühler, letztere mit Ausnahme der zwei rehbraunen Endglieder, schwarz. Kopf im Vergleich zu der mir vorliegenden *O. vigilans* Pasc., sehr breit, der Teil vor den Augen (ohne Mandibel) etwas breiter als lang, Stirn mit

gleichseitig dreieckigem, glattem Eindruck, die Fühlerhöcker sehr spärlich, der Scheitel dicht und tief punktiert, beiderseits der Mittelfurche mit einigen wenigen Punktgrübchen. Halsschild länger als an der Basis breit, Vorderrand kragenartig abgeschnürt, Basis mit tiefer Randfurche und in der Mitte mit tiefem Quereindruck, fein, aber ziemlich tief und viel sparsamer als der Kopf punktiert, ein Mittelstreifen und der abgeschnürte Vorderrand fast unpunktiert. Beiderseits innerhalb der Hinterecken, nahe dem Basalrand, mit einer Querreihe von zwei bis vier Punkten. Flügeldecken an der Spitze einzeln schräg ausgerandet, die äussere Spitze nach hinten ausgezogen, Nahtsaum fadenförmig erhaben, fein gekerbt punktiert, jede Decke mit zwei undeutlichen Rippen und dichter Punktierung, die an der Basis etwas gröber als im übrigen Teil ist und nur bei gewisser Beleuchtung zwischen den Punkten leichte Querrunzeln erkennen lässt. Unterseite sehr fein seidenartig behaart, die Hinterbrust und die Seiten des Hinterleibes äusserst fein punktiert, der Hinterrand der einzelnen Bauchsternite in mehr oder geringerer Ausdehnung geglättet. Vorder- und Mittelschenkel ganz, die hinteren mit Ausnahme des schwarzblauen Spitzenviertels, gelbrot, Schienen und Tarsen schwärzlich, die vorderen an der Wurzel bräunlich, die hinteren bläulich.

19. **Euryphagus maxillosus var. nigricollis nov. (♀).**

Differt a specie typica: capitis dimidia parte postica thoraceque, angulis posticis anguste rufis exceptis, nigris.

Hab. SIBUYAN ISLAND, legit *R. C. McGregor* (Bur. Sci. Acc. No. 1908).

E. maxillosus Oliv. lag mir in einer Anzahl von Dr. A. Schadenberg auf Luzon gesammelten Exemplaren vor, ohne dass sich darunter eine nennenswerte Abänderung gefunden hätte. Das von Herrn McGregor auf der kleinen, östlich von Mindoro gelegenen Insel Sibuyan gesammelte Weibchen zeichnet sich durch einen in der hinteren Hälfte schwarzen Kopf und schwarzen Halsschild aus. Die Verteilung der schwarzen Färbung des Kopfes ist derart, dass sie den hinter den Augen liegenden Teil einnimmt und zwischen den Fühlern in Form eines halbkreisförmigen Lappens auf die Stirn herabgezogen erscheint, ausserdem ist eine Quermakel auf der Kehle schwarz. Der Halsschild ist mit Ausnahme der roten Seitendorne und einem Streifen, der längs des Hinterrandes von den Hinterecken nach den Vorderhüften zieht, ganz schwarz.

20. **Planodes schultzei** sp. nov. (fig. 9).

Omnino aequaliter nigricans ac subtiliter ochraceo-tomentosus; elytris punctis dense ochraceo-tomentosis adspersis, fasciis tribus latis formantibus, una basali, una mediana, et una apicali; capite sat profunde punctato, fronte subrugosa; antennis rufescentibus, scapo rugoso-punctato, ut articulo tertio et quarto (his in apice exceptis) ochraceo-pilosis ac ut ceteris parce nigro-ciliatis; prothorace parce granulato-punctato, margine antico posticoque densius ochraceo-pilosis itaque pallidioribus; scutello semicirculari; elytris sat remote asperato-punctatis, humeris granulosis, sutura in dimidia parte apicali carinulata, elytris singulis pone medium sub-bicarinulatis; corpore subter subtiliter cinereo-tomentoso, segmento primo secundoque in lateribus longe fulvo-pilosis, segmentis reliquis in margine postico glabris.

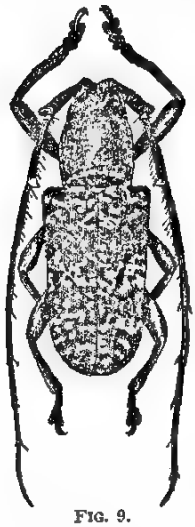

FIG. 9.

Long. corporis 22, antennarum 35, lat. elytrorum 7.5 mm.

Hab. PALAWAN, Iwahig, legit *W. Schultze* (Bur. Sci. Acc. No. 10842).

Überall ziemlich gleichmässig schwärzlich, fein lehmgelb tomentiert, die Fühler rötlichbraun, die Flügeldecken mit drei breiten Querbinden aus teilweise zusammenhängenden, dicht ockergelben Tomentpunkten, eine davon an der Basis, eine in der Mitte und eine im Spitzendrittel. Längs des Augenunterrandes und längs des Vorder- und Hinterrandes des Halsschildes ist die Tomentierung verdichtet und daher mehr weisslich. Kopf und Scheitel tief und zerstreut punktiert, die Stirn runzelig. Halsschild zerstreut und etwas raspelig punktiert, auf der Scheibe mit erlöschenden Punkten. Flügeldecken an der Wurzel und auf den Schultern gekörnt, im übrigen entfernt raspelartig punktiert, jede Deckenscheibe hinter der Mitte mit zwei undeutlichen Längsstreifen, die Naht in der Apikalhälfte mit schwacher Leiste. Unterseite gleichmässig grau tomentiert, nur das erste Bauchsternit jederseits am Hinterrande, das zweite jederseits am Vorderrande lang gelblich behaart. Hinter- und Mittelschienen aussen im Spitzenteil schwärzlich tomentiert.

Die zweite von den Philippinen von Newman im Entomologist (1842), 323, beschriebene Art ist:

20a. **Planodes quarternaria** Newman.

Sie wird a. ä. O. wie folgt charakterisiert: Nigra, lanugine fulva undique obsita, punctisque nigris irrorata; utriusque elytris maculae 2 dorsales nigrae; prima major, subrotundata, ante medium sita, secunda minor, oblonga, pone medium sita (corp. long. 0.75 unc., lat. 0.225 unc.).

21. **Agelasta mediofasciata** sp. nov. (fig. 10).

Picea, supra nigro-tomentosa, atomis dispersis, prothorace margine postico, elytris fascia mediana, albido-tomentosis; humeris subtuberculatim extantibus; antennis articulo tertio, quarto quintoque in dimidia parte basali, ultimo fere toto albidis; corpore subter, pro- et metasterno, marginibus segmentorum abdominalium articulisque tribus ultimis tarsorum, albido-tomentosis; episternis metasternalibus in dimidia parte anteriore nigris.

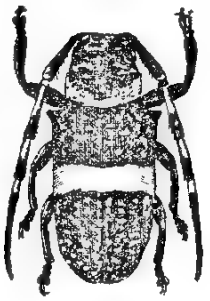

Fig. 10.

Long. 16, lat. 7 mm.

Hab. SIBUYAN, legit *R. C. McGregor* (Bur. Sci. Acc. No. 1902).

Von allen bekannten Arten durch die etwas höckerartig vorspringenden, rechtwinkeligen Schultern und die weisse Binde in der Deckenmitte ausgezeichnet. Schwarz, grösstenteils schwärzlich tomentiert, oberseits überall mit weissen Tomentpunkten bestreut, ebenso der ganze Basalrand des Halsschildes weiss, Stirn mit undeutlicher glatter Mittellinie, die weissen Tomentpunkte am Seitenrand etwas streifenartig zusammenfliessend. Fühler schwarz, 3., 4. und 5. Glied in der Basalhälfte, das letzte, mit Ausnahme der Wurzel, ganz weiss. Halsschild stark quer, an den Seiten mit groben, zerstreuten Punkten, die sich längs des weisstomentierten Hinterrandes fast bis zur Mitte erstrecken, die Scheibe vorherrschend schwarz. Schildchen quer, schwarz, in der Mitte an der Wurzel weiss tomentiert. Flügeldecken in der hinteren Hälfte mit eingedrücktem Suturalstreifen, an der Wurzel dicht und leicht raspelartig punktiert, mit gleich breiter, weisstomentierter Querbinde in der Mitte, die ungefähr halb so schmal ist wie der schwarze Basalteil der Decken, dieser sowie der schwarze Apikalteil mit weissen Tomentpunkten. Vorder- und Hinterbrust dicht weiss, Episternen und Epimeren der Mittelbrust vorherrschend schwarz, die Episternen der Hinterbrust nur in der vorderen Hälfte schwarz tomentiert. Abdominalsternite hinten weiss gerandet.

Die Art erinnert etwas an *A. sulphuræ* Pasc. aus Celebes.

22. **Euclea rhombifera** sp. nov. (fig. 11).

Aterrima, fronte utrinque vitta, prothorace vitta laterali ad medium marginis antici convergenti; elytris in disco signatura fere quadrata, diagonaliter disposita, macula marginali transversa, subapicali vittaque subsuturali, brevi, ad apicem, cretaceo-tomentosis; fronte irregulariter punctato, linea mediana indistincta, levi; scapo fortiter ruguloso-punctato, antennis articulo tertio quartoque in dimidia parte basali griseis; prothorace rude punctato, in dimidia parte basali vitta mediana levi; scutello nigro, transverso, subtriangulari; elytris ad basin sat rude, retrorsum sensim subtilius punctatis, ad suturam leviusculis; corpore subter maxima parte cretaceo-tomentoso, sternitis abdominalibus 2., 3., 4. in parte mediano, aut fere totis, nigro-glabris.

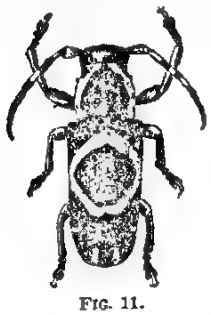

FIG. 11.

Long. 13.5–17, lat. 4–5 mm.

Hab. TICAO INSULA, legit *R. C. McGregor*, et NEGROS, Faraon, legit *H. M. Curran* (Bur. Sci. Acc. Nos. 1448, 1099 et 12209).

Tief schwarz, mit gelblich weisser Tomentzeichnung. Stirn unregelmässig und grob punktiert, mit undeutlicher, glatter Mittellinie, jederseits mit einem bis zum Hinterrande der Augen nach hinten reichenden Tomentstreifen. Erstes Fühlerglied grob runzelig, 3. und 4. Glied in der Basalhälfte grau. Halsschild etwas länger als breit, grob punktiert, in der Basalhälfte mit glattem Mittelstreifen, an den Seiten mit breitem, im vorderen Drittel nach der Mitte des Vorderrandes zu divergierenden Tomentstreifen, zuweilen auch der Basalrand schmal gelblich. Schildchen quer, schwarz. Flügeldecken kräftig punktiert, die Punkte nach der Naht und nach hinten zu etwas kleiner, Nahtsaum glatt, Mitte der Naht von einer fast quadratischen, weisslich tomentierten Figur umschrieben, die diagonal zur Naht orientiert ist, mit ihrer vorderen Ecke fast das Schildchen, mit ihrer hinteren Ecke das zweite Drittel der Naht erreicht, und deren Aussenecken als breites Band bis zum Seitenrande verlängert sind. Ausserdem am Rande jeder Decke, hinter dem zweiten Drittel, eine kleine Quermakel und neben der Nahtspitze ein kurzer Tomentstreifen von weisslicher Farbe. Unterseite dicht tomentiert, 2.–4. Bauchsternit nur in der Mitte, oder ganz kahl. Beine schwarz, Schenkel sehr fein grau pubescent, Vorderschienen mit schwarzen Wimpern.

Die Art ist am nächsten mit *E. illecebrosa* Pasc. verwandt, unterscheidet sich aber von ihr, ausser durch die abweichende Anlage der Tomentzeichnung, vor allem dadurch, dass die dunklen Teile der Decken und des Halsschildes, die bei *illecebrosa* bläulich schwarz und grösstenteils glänzend kahl, bei *rhombifera* tief schwarz und fein schwarz tomentiert sind. Halsschild relativ kürzer, kräftiger punktiert und in der hinteren Hälfte der Mittellinie mit kahler Längsschwiele. Zu den von G. A. Baer [Ann. Soc. ent. France (1886), 156] angeführten Arten von den Philippinen kommt ausserdem noch die ebenfalls durch die Deckenzeichnung leicht kenntliche *Euclea tagala* Hell. [Abh. u. Ber. Mus. Dresden (1898–99), 7, 6] hinzu.

23. **Encaustes palawanica** sp. nov. (fig. 12).

E. gigantea Boh. paulo minor, capite maculis rotundatis, obscure rufis, tribus, una mediana ad labri basim, altra utrinque ad oculi marginem interiorem; prothorace utrinque plaga fulva, oblongo-trapezoidali, margine interno et postico sinuatis; scutello valde transverso, pentagonali; elytris plaga magna, basali, scutellum vix tangente, margine postico triangulariter emarginato, fascia postmediana, laterali, valde coarctata, fere divisa, macula subquadrata in medium, pone suturam, lunula transversa, ante-apicali maculaque triangulari apicali, fulvis; tibiis in parte apicali fulvo-tomentosis.

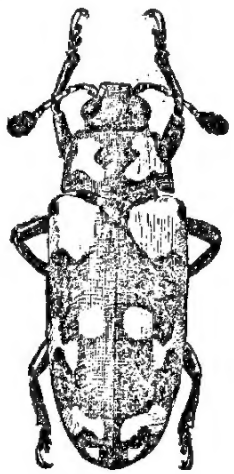

Fig. 12.

Long. 30, lat. 10 mm.

Hab. PALAWAN, Iwahig, legit *C. H. Lamb* (Bur. Sci. Acc. No. 13213).

Wenig kleiner als *E. gigantea* Boh. und sowie *E. tagala* sp. nov. dadurch ausgezeichnet, dass die Basalbinde der Decken am Vorderrand, innerhalb der schwarzen Schultern, ganzranding ist. Kopf in der Mitte des Basalrandes der Oberlippe und jederseits am hinteren Ende des inneren Augenrandes mit dunkelroter Makel. Halsschild quer, sehr fein und mässig dicht punktiert, beiderseits am Hinterrand, etwas näher dem Seitenrand als der Mittellinie, mit eingedrücktem Schrägstrichelchen. Schildchen stark quer, pentagonal. Flügeldecken mit Längsstreifen aus unregelmässig zusammengedrängten, feinen Pünktchen. Basal-

binde sehr breit, am Hinterrande winkelig ausgerandet. Mitte des Seitenrandes mit einer schräg nach hinten und nach der Naht zu gerichteten Binde, die stark eingeschnürt ist, vor ihrem Ende beiderseits neben der Naht, eine fast quadratische Makel; Spitzendrittel mit einer dreieckigen Längsmakel. Spitzendrittel der Schienen rostrot tomentiert.

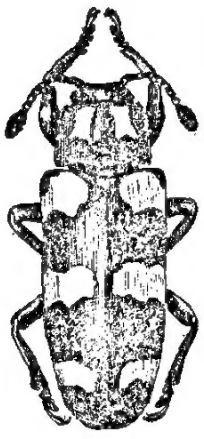

FIG. 13.

24. Encaustes tagala sp. nov. (fig. 13).

Niger, thorace maculis duabus, elytris sex fulvis ornatis; capite subtiliter punctato, fronte in medio verticeque glabriusculis; prothorace utrinque macula vittiforme (antice haud dilitata), postice thoracis dimidia parte paulo superante; elytris singulis maculis transversis tribus, latis, antica solum margine anteriore ad callum humeralem emarginata.

Long. 27, lat. 9 mm.

Hab. LUZON, Benguet, Irisan, legit *W. Williamson* (Bur. Sci. Acc. No. 6482).

Bedeutend grösser als *E. malayana* Guér. und dieser sehr ähnlich gezeichnet, die Basalmakel der Decken aber innerhalb der schwarzen Schultern ohne Ausrandung am Vorderrande. Kopf feiner punktiert, drittes Fühlerglied so lang wie das 6. und 7. zusammen. Halsschildform wie bei *E. malayana*, nur wenig flacher und auf der Scheibe noch feiner punktiert, beiderseits am Hinterrande, neben dem Scutellarlappen, flach eingedrückt, mit eingegrabenen Längsstrichelchen. Die ähnlich wie bei erwähnter Art geformten Halsschildmakeln sind kürzer und aussen, am vorderen Ende, nicht in die Breite gezogen. Schildchen sehr stark quer, breiter und kürzer wie bei *E. malayana*. Flügeldecken mit feinen, zerstreuten Pünktchen, die der undeutlichen Streifen unregelmässig und nicht stärker markiert. Die gelbroten Deckenmakeln an ihren Rändern weniger gezackt, die vordere ganzrandig und nur an den Schultern mackelartig ausgeschnitten. Unterseite und Beine, auch die in der vorderen Hälfte innen gekerbt-gezähnten Vorderschienen, wie bei der mit ihr verglichenen Art.

25. Triplatoma exornata sp. nov. (fig. 14).

Niger, elytris vix purpureo-aenescentibus, antennis pedibusque subrufescentibus, fronte utrinque lunula, prothorace (ut in T. macleayi Lac.) vitta in dimidia parte postica biramosa, marginem

posticum attingente, macula in medio marginis anticis, elytris in disco vittis parallelis, figuram ellipticam formantibus, ramis duabus ad marginem lateralem, duabus antrorsum, duabus postrorsum exmittentibus fasciaque anteapicali fulvis; prothorace angustiore quam in T. maclayi, lateribus minus rotundatis; elytris subtiliter seriatopunctatis, striis in parte apicali evanescentibus. Long. 19, lat. 7 mm.

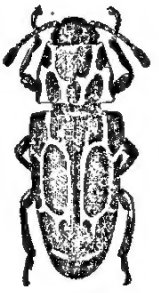

Fig. 14.

Hab. Tawi Tawi, legit *F. W. Foxworthy* (Bur. Sci. Acc. No. 12565).

Schmäler als. *T. maclayi* Lac., namentlich der Halsschild gestreckter, sein Randsaum der ganzen Länge nach kräftiger, Kopf und Halsschild mit ganz ähnlicher gelbroter Zeichnung, nur reichen die medianen Längsbinden in der hinteren Halsschildhälfte bis zum Hinterrand. Schildchen ebenfalls wie bei der erwähnten Art, stark quer, fünfeckig. Flügeldecken sehr schwach erzglänzend, mit feinen Punktreihen, die im Spitzendrittel erlöschen, die Spatien deutlicher wie bei *T. maclayi* zerstreut punktiert. Die gelbrote, sehr charakteristische Deckenzeichnung besteht aus zwei Längsstreifen, die das zweite bis vierte Fünftel des ersten und fünften Spatiums einnehmen und vorn und hinten in Form einer langgestreckten Ellipse verbunden sind und sowohl vorn wie hinten nach den Seitenrändern zu, als auch auf dem vierten Spatium nach der Wurzel, auf dem 3. Spatium nach der Spitze zu einen Ast entsenden, ausserdem vor der Spitze mit einer welligen Schrägbinde. Unterseite schwarz, Seitenrand der Vorderbrust, eine Makel zwischen den Vorderhüften, je eine Quermakel an den Seiten in der hinteren Hälfte der Abdominalsternite und das Analsternit ringsum am Hinterrande rot.

TEXTFIGURENERKLARUNG

FIG. 1. *Nanoplaxes merrilli* gen. et sp. nov.
2. *Cyamobolus* (?) *palawanicus* sp. nov.
3. *Cercidocerus flavopictus* sp. nov.
4. *Eutornus stricticollis* sp. nov.
5. *Eutornus luzonicus* sp. nov.
6. *Eutornus rufobasalis* sp. nov.
7. *Amphicordus improportionatus* gen. et sp. nov.
8. *Henarrhodes macgregori* gen. et sp. nov.
9. *Planodes schultzei* sp. nov.
10. *Agelasta mediofasciata* sp. nov.
11. *Euclea rhombifera* sp. nov.
12. *Encaustes palawanica* sp. nov.
13. *Encaustes tagala* sp. nov.
14. *Triplatoma exornata* sp. nov.

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